BERMUDA

IMPERIAL BUREAU OF MYCOLOGY
4 AUG 1925

REPORTS

OF THE

Board and Department of Agriculture

FOR THE YEAR

1924

PRINTED BY
THE MID-OCEAN PRESS
FRONT STREET, HAMILTON, BERMUDA

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Board of Agriculture, 1924.

Honble. S. S. SPURLING, C.M.G., O.B.E., M.C.P., St. Georges, *Chairman*. Resigned 7th June.

Honble. J. P. HAND, M.B.E., Pembroke, *Vice-Chairman*, Appointed *Chairman* 7th June.

E. F. ZUILL, Esq., M.C.P., Devonshire. Appointed *Vice-Chairman*, 7th. June.

B. C. C. OUTERBRIDGE, Esq., M.C.P., Smiths.

W. A. H. BARNES, Esq., Southampton.

H. E. D. SMITH, Esq., St. Georges.

J. DEMOURA, Esq., Southampton.

J. H. HOLLIS, Esq., Hamilton Parish.

W. A. MOORE, Esq., M.C.P., Paget.

W. J. H. TROTT, Esq., Pembroke, Re-appointed 9th June.

Department of Agriculture, 1924.

Director of Agriculture, E. A. MCCALLAN.

Plant Pathologist, LAWRENCE OGILVIE, M.Sc., M.A., B.Sc.

Inspector of Produce, G. E. WINTER.

Government Veterinary Officer, R. L. TUCKER, D.V.S., (Part-time officer).

First or Second Agricultural Assistant, Vacant.

Clerk, G. L. YOUNG.

Assistant Inspector of Produce, E. L. ADAMS, (Part-time officer).

Sub-Inspectors of Produce during Season of 1923-1924, F. W. WILLIAMS, T. H. DOE, C. V. S. EARLY and W. J. SOANES, (Part-time officers).

Sub-Inspectors of Produce during Season of 1924-1925, T. A. HOLLIS, Jr., C. V. S. EARLY, and M. J. KING (Part-time officers).

Agricultural Station,

Bermuda,

11th. May, 1925.

Sir,

I am directed by the Board of Agriculture to lay before His Excellency the Governor, for the information of the Legislature, the accompanying reports of the Board and Department of Agriculture for the year ended 31st December, 1924.

I have the honour to be,

Sir,

Your obedient servant,

G. L. YOUNG,

Clerk, Board of Agriculture.

The Honourable

The Colonial Secretary,

Hamilton, Bermuda.

Report of The Board of Agriculture For the Year 1924.

———o———

The year 1924 was more favourable to local agriculture than were the years immediately preceding it. The year under report may be considered to have been a fairly profitable one, at least to farmers who grew celery and parsley. Practically all kinds of exported produce exceeded similar exports of 1923, and better prices were obtained for some commodities.

Efforts in various directions have been and are being made, first, to aid and encourage the Bermuda farmers to increase their acreage under cultivation, especially for early potatoes, and, secondly, to find new and regular markets for such produce. In connection with the former, the Department of Agriculture has instituted throughout the Island a system whereby farmers may receive the weekly quotations for produce sold in New York, and thus be kept up to date regarding market prices. The inspection services of the Department continue to enlarge. The practice of visiting farms accompanied by the Parish's representative on the Board of Agriculture is likely to be helpful to farmers, and give very good results. A greater effort is being made at Bermuda's Section at the British Empire Exhibition this year to investigate the British market, particularly with regard to the lily industry. It is hoped, also, that as a result of the coming into operation on 1st. January, 1925, of The Shipment of Produce to Canada Act, 1923, under which the Board of Agriculture is authorized to license shippers of onions to Canada, this branch of local industry will benefit.

Very largely because of the interest taken in the matter by His Excellency the Governor, arrangements have been made by the Board to appoint agricultural students under the provisions of Section 10 of The Agricultural Department Act. It is hoped in this way to emphasise the value of and increase the interest in farming. In addition to these regular students, the lectures are open to senior scholars of the Colony, and every encouragement is given to prospective farmers. Boys' and Girls' Agricultural Clubs were organized in 1917, and are very generously supported by His Excellency the Governor and others, who have donated prizes. The Department of Agriculture has distributed more than a thousand packages of vegetable seeds through the Clubs, and the work has been greatly helped by the interest and supervision voluntarily taken by Mr. S. C. Hicks.

On behalf of the Board, I wish to acknowledge with appreciation the many courtesies extended to the Department of Agriculture by the Royal Gazette and Colonist Daily and the Mid-Ocean. The value to the community generally and to farmers particularly of the articles contributed by the Plant Pathologist and other members of the Department can be readily understood. The experimental work being done in the treatment of

various pests and plant diseases, and the advice available to farmers on application to the Plant Pathologist is fully demonstrating the value of this officer to the Department and to the Colony.

Though the Farmers' Market has not grown as was anticipated, it is serving a large number of people and controls prices to the benefit of producers and consumers. During the year about 16,000 persons patronized the Market. An effort has been made to impress upon the Hotel Men's Association—at one of which meetings the subject was fully discussed—the value of buying Bermuda-grown produce. As a result of the Board's efforts, the hotels have declared themselves willing to purchase their supplies at the Farmers' Market and from other local sources, and several of the larger hotels have made a point of specialising on their menus when the vegetables were home grown.

As regards freight rates and chill-room accommodation for our local produce, the Board, in co-operation with the Trade Development Board, has succeeded in arranging lower freight rates, a better steamship service and more chill-room accommodation for produce as between New York and Bermuda. Negotiations are shortly to be entered into at a Trade Conference in Ottawa, where the question of Bermuda's subsidy towards an improved steamship service, including chill-room accommodation, is to be taken up, and the hope is expressed that this will lead to a greater marketing in Canada of Bermuda produce—particularly of onions, tomatoes and green vegetables. In this connection I am pleased to note that arrangements have been made for a single Canadian house to receive and distribute Bermuda produce throughout the Dominion of Canada, and this should lead to much more satisfactory results than heretofore.

The Annual Agricultural Exhibition continues to be an outstanding annual feature of the Department's activities, and the Show for 1924 was even more successful than anything formerly achieved.

Detailed accounts of the various branches of the Department of Agriculture are ably given in full reports from the various officers of the Department, and the Director and his entire staff are to be congratulated on the energy and capability shown in the despatch of their duties.

J. P. HAND,
Chairman, Board of Agriculture.

Hamilton,
15th April, 1925.

Report of the Director of Agriculture For the Year 1924.

The Chairman,
Board of Argiculture,

In accordance with the provisions of The Agricultural Department Act, 1921, I have the honour to submit my report for the year 1924. Reports of other officers of the Department are also submitted.

AGRICULTURAL STATION.

An account of the principal work performed at the Agricultural Station during the year under report follows:

Potatoes.—Potatoes continue to receive major attention, but efforts to improve the quality of imported Triumph seed has resulted, in part, in signal failure.

TRIUMPHS.—During the season of 1923-1924 the following strains were under test at the Station, and the leaf-roll and mosaic readings were as follows:

Strain.	Leaf-roll.	Mosaic.
(1) Hickox-Rumsey, grown by self on Long Island	12.3%	2.9%
(2) Hickox-Rumsey, grown by Zimmer on Long Island	21.9	5
(3) Hickox-Rumsey, grown at Batavia	14.5	(not counted)
(4) New Brunswicker	2.3	78.5
(5) Forsling, Neb., grown on Long Island	8	5
(6) Belmont	.25	8

The following yields in pounds per rod were obtained:

(1)	26	plots,	highest yield,	98;	lowest yield,	64;	average,	79.3
(2)	11	"	"	83;	"	64;	"	73.8
(3)	48	"	"	113.6;	"	64;	"	87.2
(4)	23	"	"	91.2;	"	37;	"	62.2
(5)	6	"	"	92;	"	66;	"	83.0
(6)	10	"	"	156.8;	"	99.2;	"	94.8

In the Fall of 1924 the following strains were planted, and the following readings obtained:

Strain.	Leaf-roll.	Mosaic.
(1) Hickox-Rumsey, grown by self on Long Island	29.5%	2.9%
(2) Radcliffe, Wis., grown by Zimmer on Long Island	2.5	(not counted)
(3) New Brunswicker	.35	28.8
(4) Belmont	1.4	27
(5) Unknown, imported by farmer for own use	34.7	64.2

The above readings were made in plots planted on 24th October. Mosaic was screened in the earlier plantings.

The behaviour of Triumphs is further treated under "Potatoes" elsewhere in this report.

GARNETS.—In February, 1924, twenty-nine strains of Garnets from Nova Scotia were planted. The number of strains was larger than usual because of the kindness of Mr. W. K. McCulloch, Dominion Inspector, and Mr. H. H. McNutt, Secretary of the Clifton Seed Centre, in supplying the Department with samples. The behaviour of the seed was generally satisfactory with respect to freedom from leaf-roll, as the following shows:

Free from leaf-roll	14	strains
Averaging 1.01%	10	"
Containing over 2% (3%, 4.5%, 5%, 6% and 12%)	5	"
Total	29	"

This information was made known to the Dominion Inspector, and the growers of the five poor strains were persuaded to change their seed for better.

It is evident that some strains of Nova Scotia Garnets are more productive than others, for example, of two strains planted in parallel rows in fourteen plots, one gave larger yields in ten plots and a total yield 14 per cent higher than the other; the better strain was also planted in parallel rows with another in ten other plots, and again showed its superiority by an increase of 22 per cent. The information gained in these experiments will guide in the selection of seed in the future.

Small samples of Garnets grown at Batavia, N.Y., by Messrs. Hickox-Rumsey and at Moncton, N.B., by Messrs. J. A. Marvin, Ltd., were tested with the following results:

Strain.	Leaf-roll.	Yield per rod
Hickox-Rumsey	14.3%	112 lbs.
Marvin	0	118 "
Nova Scotia	1.3	112 "

GREEN MOUNTAINS.—A sample of Green Mountains was tested for Mr. Julian A. Dimock, East Corinth, Vermont, and was found to be free from leaf-roll and mosaic.

ENGLISH WHITE KIDNEYS.—Ten varieties of English White Kidney potatoes were planted on 18th October, 1923. They were shipped to England, and though they arrived in good condition, the prices obtained during three years do not appear to warrant the continuation of the experiment.

NITRATE OF SODA TREATMENT FOR HASTENING SPROUTING.—This experiment begun in 1923, was dug in 1924, and in the majority of cases the treated seed gave larger yields. A second test gave no conclusive results. The treatment is very simple, and consists of soaking the cut seed for two hours in a

nitrate of soda solution composed of one pound of nitrate of soda to three and one-third gallons of water.

FERTILIZER TESTS.—Fertilizer tests extending over several years were continued. It is proposed to present the results in a separate report.

Green Vegetables.—Tests were made of a large number of vegetables.

BEET.—Twenty-seven samples were tested, chiefly Egyptian and Crosby's Egyptian. For the New York market the former is preferable, if of good type, for this variety is earlier, is of good colour, has medium top, and if forced does not grow coarse as does Crosby's. For colour and shape Egyptian scored 82, and Crosby's Egyptian 76. In yield Crosby's is slightly superior.

The beets planted in the Fall of 1924 for the 1924-1925 season contained strains similar to those cultivated in Florida for the New York market.

CABBAGE.—Nine varieties of cabbage were planted, but were attacked by **Phytometra brassicae** which reduced the crop. Allhead Early is an excellent variety.

CARROT.—Forty-four samples of carrot were tested, chiefly Chantenay and Danvers. Chantenay is strongly recommended, for it is superior to Danvers in shape, colour and top, and as a rule gives slightly heavier yields. Early Market is a good variety.

CAULIFLOWER.—Three varieties of cauliflower were tested. Early Snowball and similar types are best suited to Bermuda conditions.

CELERY.—No tests were made at the Station. Seed of six strains were issued to ten farmers. Twelve strains were tested by Mr. W. R. Lightbourn, Smiths, for the Department. Of the strains tested Wonderful was considered the best, but for general cultivation not equal to Clause's strain of Golden Self-Blanching.

CORN, SWEET.—Six samples of three varieties were planted. For the home garden Golden Bantam is recommended. In this year's tests Stovell's Evergreen proved a heavy cropper.

KOHL RABI.—Seven strains of kohl rabi were tested. Early white varieties should be planted exclusively, and Carter's Early White is strongly recommended.

LETTUCE, CABBAGE.—Nine samples were tested, of which Big Boston was considered the best.

LETTUCE, COS.—Twenty-six samples were tested, but no definite conclusions were arrived at regarding the relative merits of the strains tested.

PARSLEY.—Sixteen samples were tested. There appears to be slight difference in the many strains of double curled and moss curled, as a rule, but one strain, Double Curled, imported from Messrs. S. D. Woodruff by Messrs. J. Perry & Co., germinated badly, and proved to be untrue to type.

PUMPKIN AND SQUASH.—Sixteen samples were tested. Cushaw or Crookneck squash is a good eating variety and as a rule yields well. This year the heaviest yields were produced by Italian Vegetable Marrow or Cocozelle and Pattypan or Cymalon squash. Two samples from the Azores, marked "pumpkin" and "squash" respectively produced fruit of fair quality. The pumpkins were early attacked by downy mildew **Plasmopara cubensis** which reduced the yields.

Fodder Corn.—Eleven kinds of fodder corns were planted, and again Teosinte proved a heavy yielder, being second; Loaming Yellow Ensilage giving the heaviest yield.

Roselle.—Roselle or Jamaica sorrel **(Hibiscus Sabdariffa)** was planted for the second season, and cropped fairly well. The calyxes and surrounding bracts are used as a preserve.

Onions.—Seven samples of White (or Yellow) Bermuda onion seed were tested with the results given below:

Strain.		Percentage of freedom from pink-skinned bulbs.	Weight per rod.
California-grown, Sample	A	95	230 lbs.
Teneriffe-grown, "	B	97.4	247 "
" " "	C	99	248 "
" " "	D	95.8	214 "
" " "	E	100	224 "
" " "	F	97	131 "
" " "	G	98	249 "

The plot was seeded 31st October, 1923, on well-manured land, and was liberally fertilized. Pink-root infestation was moderate. The crop was reaped 21st. May, but was marketable three weeks earlier.

The above test was not transplanted. Plants thinned from the beds were transplanted on 18th January, and there was a marked decrease in the percentage of seed-stems in the transplanted plots as the following shows:

	Percentage of freedom from seed-stems	
	Not transplanted.	Transplanted.
Sample A	82.6	99.4
" B	68	99.2
" C	81.5	100
" D	72.9	99.8
" E	53	100
" F	79.5	99
" G	70	99

Green Manuring.—The practice of planting practically all experimental plots to cowpeas or soy beans for green manuring was continued during the year under report. It is a practice

that would prove profitable to all farmers, and is strongly remended.

Fruit.—An unusually heavy crop of citrus fruit was promised, but the severe drought in October and thieves during the ripening period reduced the number of ripe fruit. On Christmas Eve 600 grapefruits were gathered. From the heaviest bearing trees the following numbers were picked, 220, 160 and 130. Oranges and other fruit trees cropped well, but little or no fruit was gathered because of constant pilfering.

Flower Beds, Lawns and Green-houses.—The Station was without a gardener from May, 1923, to February, 1924, when Miss Doris K. Turnbull, a graduate of the Horticultural College for Women, Swanley, England, was engaged. The flower beds, lawns and greenhouses have been maintained in good order, and many minor improvements have been affected, for example, a rock-garden has been made. A collection of English roses was planted during the last week in the year. The improvement of the newer portion of the Station (Montrose) is progressing very slowly.

The following donations of seeds and plants are acknowledged: Collection of Acasias from Australia given by Mrs. T. O. D. Tucker; seeds of Kukui (**Aleurites moluceana**) and five species of Cassia given by Mr. Gerrit P. Wilder of the Bishop Museum, Honolulu, Hawaii; collection of miscellaneous seeds from South Africa given by Mrs. J. Montgomery Sears; native orchids from the Cayman Islands given by Hon. H. H. Hutchings; gladiolus corms given by Capt. G. M. Churcher, R.A.; and others.

Gold-Fish Tank.—Permission was given the Medical and Health Department to construct at the Station a tank for breeding gold-fish. The overflow from the tank was directed to flow into two pools in the rock-garden.

Live Stock.—At the close of the year the stock of the Department consisted of the following Guernseys:

Albamont Titan (76061); sire, Albamont Raier of Linda Vista; dam, Spalding of Gerar; born, 21st September, 1921; breeder, J. C. Haartz, Campton, N.H.

Montrose Sovereign (106,389); sire, Albamont Sovereign; dam, Dora of Atwood's Dairy; born, 6th January, 1922 (at Agricultural Station); breeder, J. C. Haartz, Campton, N.H.

Albamont Argonaut (888459); sire, Cramond Defiance; dam, Albamont Forget-me-not; born, 31st December, 1922; breeder, A. M. Haartz, Campton, N.H.

Montrose King (106391); sire, Montrose Sovereign; dam, Albamont Juliet; born, 29th September, 1924; breeder, Department of Agriculture.

Dora of Atwood's Dairy (73697); sire, Jethro's Squire of Maple Ranch; dam, Idol's Ellen; born, 7th January, 1917; breeder, Est. of John Hopewell, Natick, Mass.

Albamont Juliet (85736); sire, Deanie's May King; dam, Juliana of Gerar; born, 20th April, 1918; breeder, J. C. Haartz, Campton, N.H.

The following animals have been disposed of during the year: Montrose Pioneer (106390); sire, Don Diavolo's Bermuda Pioneer; dam, Albamont Juliet; born 25th January, 1923; breeder, Department of Agriculture. The animal was sold to Mr. W. A. H. Barnes, Southampton, and is standing for service on his farm. A heifer calf of Dora of Atwood's Dairy was sold to Mr. B. C. C. Outerbridge, M.C.P., Smiths, and is developing into a fine animal. It was considered expedient to sell to the butcher a bull calf out of Albamont Juliet, a four-year Guernsey bull and a five-year Ayrshire bull.

Montrose Sovereign and Albamont Argonaut are standing for service at the Station, and Albamont Titian at the farm of Mr. James Morgan, Southlands, Warwick. The animal was on the farm of Mr. B. C. C. Outerbridge until July when it was moved to Southlands. The Department is under obligation to both gentlemen for their interest and assistance in the improvement of dairy cattle.

The production of the two cows at the Station has been as follows:

Dora of Atwood's Dairy, 5,972 pounds in 335 days.

Albamont Juliet, 4,137 pounds in 315 days.

Early in the year two large paddocks with stone sheds were arranged for the bulls which are now in safe and comfortable quarters. The cow and calf stables are by no means satisfactory, and modern sanitary buildings should be constructed as soon as practicable.

In December a registered Toggenburg buck goat, Mayfly of Lorraine (18970), was imported. The animal was selected for the Department from the herd of Mr. T. D. John, Beltsville, Md. by the Bureau of Animal Industry of the United States Department of Agriculture, and the Department is under special obligation to Mr. C. G. Potts for his courtesy in the matter. An in-kid doe was on order at the time, but did not reach here until after the close of the year. Correspondence took place between Dr. M. Cummings, Secretary of Agriculture for Nova Scotia, relative to the purchase of Berkshire breeding stock, but circumstances prevented the importation of the animals, and Dr. Cummings has very kindly promised to select and forward them at the close of the present winter. The Bermuda Development Co. presented a deer to the Station.

Egg-Laying Competition.—At the request and with the assistance of the Bermuda Poultry and Pet Stock Association, a four-month's egg-laying competition was opened at the Station on 15th October. A suitable building was constructed by Station workmen under the direction of the Inspector of Produce. Ten pens of four pullets each, representing six varieties of the following breeds were entered, Plymouth Rock, Wyandotte, Rhode Island Red and Leghorn. Considerable interest was taken in the competition; and the Association, and particularly the Honorary Secretary-Treasurer, Mr. W. R. Evans, are to be congratulated on the success attending it.

Disposal of Milk, Vegetables and Eggs.—The greater part of the milk is donated to the King Edward VII Memorial Hospital. Vegetables are sold locally or in New York or given to other institutions. By arrangement with the owners the eggs produced in the competition were sold, and feed and attendance paid for with the sales. The value of the produce sold and donated will be found in Appendix D.

Visitors.—His Excellency the Governor, Sir J. J. Asser, has continued a frequent visitor. Of prominent strangers who visited the Station the followning are mentioned: Dr. Donald Folsom, of the Maine Experiment Station who addressed the Board and two farmers' meetings on potato mosaic and leaf-roll; Mr. N. I. Bowditch, Trustee of Massachusetts State College of Agriculture, who contributed to and assisted at the Agricultural Exhibition; Mr. and Mrs. J. Cameron Bradley, also contributors to the Exhibition; and Mr. F. de L. Clements, grower of certified seed potatoes, who addressed the Board on that subject.

Agricultural Students.—Very largely because of the interest taken in the matter by His Excellency the Governor, arrangements were made late in 1924 to appoint in the New Year agricultural students under the provisions of Section 10 of The Agricultural Department Act, 1921. The instruction to be given will include weekly lectures which are open to the senior scholars of the Colony. The majority of the lectures will be on botany and chemistry, and will be given by the Plant Pathologist; the Director will lecture chiefly on farm management; the Government Veterinary Officer on animal husbandry; and the Agricultural Assistant on poultry keeping. Other lectures will be included.

Office Work.—The work to be done in the office keeps pace with the increasing activities of the Department, and one Clerk, who is also Clerk to the Board, cannot successfully cope with it. The routine work is, as a rule, well in hand, but there is seldom time to compile complete permanent records and the like, and such are of unusual value in agricultural experimental work. Additions to the staff were in contemplation at the close of the year, and there appears to be some reason to hope that the compilation of records and other equally important work may soon be satisfactorily undertaken.

During the year 1,173 letters were received and 1,486 dispatched, an increase in correspondence of 5 per cent over that of the previous year. The preparation of articles for the press and the Agricultural Bulletin, and the publication of market information are but two items which give rise to considerable work in the office. The secretarial and accounting work of the Agricultural Exhibition was performed in the office with little extra assistance.

Rainfall.—The rainfall at the Station has been recorded daily at 9 a.m. by the Secretary of the King Edward VII Memorial Hospital, and the weekly records are here given:

Jan. 5.	1.25 inches.	July 5.	1.31 inches
" 12.	.41 "	" 12.	.02 "
" 19.	1.54 "	" 19.	1.58 "
" 26.	.67 "	" 26.	5.00 "
Feb. 2.	.55 "	Aug. 2.	1.02 "
" 9.	.56 "	" 9.	3.87 "
" 16.	2.93 "	" 16.	1.24 "
" 23.	.42 "	" 23.	.61 "
Mar. 1.	2.45 "	" 30.	—
" 8.	1.18 "	Sept. 6.	.80 "
" 15.	1.51 "	" 13.	2.01 "
" 22.	.92 "	" 20.	.39 "
" 29.	2.15 "	" 27.	.56 "
Apr. 5.	.51 "	Oct. 4.	—
" 12.	.37 "	" 11.	.04 "
" 19.	—	" 18.	—
" 26.	1.17 "	" 25.	3.05 "
May 3.	1.00 "	Nov. 1.	1.50 "
" 10.	2.27 "	" 8.	.47 "
" 17.	.15 "	" 15.	3.34 "
" 24.	.72 "	" 22.	.23 "
" 31.	1.34 "	" 29.	.64 "
June 7.	—	Dec. 6.	.84 "
" 14.	2.57 "	" 13.	.10 "
" 21.	3.02 "	" 20.	.03 "
" 28.	—	" 27.	.27 "

Total for year, 58.58 inches.

Note.—The records of the rainfall at the Station were not begun until the week ended 16th February, and the Department is under obligation to Lt.-Col. P. Davidson, R.A.M.C., Officer-in-Charge Observatory, Prospect, for the records of the first six weeks of the year. There would be, of course, some differences in the records taken at the two localities.

AGRICULTURE IN 1924.

The year under report was more favourable to local agriculture than were those immediately preceding it. Practically all kinds of exported produce exceeded similar exports of 1923, and better prices were obtained for some. There was also a substantial increase in the quantity of produce grown for local consumption.

The total quantities of produce (exclusive of lily bulbs) shipped during the last ten years is given below:

1915	484,079 bushels
1916	548,862 "
1917	541,126 "
1918	382,325 "
1919	538,126 "
1920	513,938 "
1921	470,225 "
1922	379,082 "
1923	318,761 "
1924	416,604 "

The quantity shipped in 1924 was 92 per cent of the quantities shipped annually during the last decade.

The New York value of the produce (exclusive of lily bulbs) shipped to that market during the season under report was approximately $1,204,000.

Note: The Department is indebted to the Whitney Institute for computing the above value.

The approximate or estimated local values of all agricultural products are given below:

Produce exported to United States	£173,000
Produce exported to Canada	4,000
Produce exported to West Indies	2,500
Lily bulbs exported	12,500
Produced for domestic consumption—	
Vegetables	44,000
Bananas	17,000
Milk	61,000
Eggs and poultry	34,000
Meat, chiefly pork	18,000
	£366,000

In this connection it is pointed out that in 1924 the Colony expended through the Department of Agriculture, inclusive of salaries, the sum of £6,753. 13. 2 to promote an industry with an annual value of £366,000.

The prices obtained in 1924 were almost precisely fifty per cent higher than those obtained in 1913 (pre-war standard) and the cost of production is estimated to have been from 75 per cent to 100 per cent higher. The year under report may be considered to have been a fairly profitable one, at least to farmers who grew celery and parsley.

POTATOES.

The exports of potatoes during the last ten years have been as follows:

1915	51,519	barrels
1916	55,166	"
1917	74,578	"
1918	69,453	"
1919	91,777	"
1920	54,031	"
1921	58,955	"
1922	43,651	"
1923	33,604	"
1924	35,254	"

The quantity shipped in 1924 was 5 per cent larger than that of the previous year, but only 61 per cent of the last ten year's average. The New York value of potatoes sold in that market was approximately $380,000. Weather conditions were for the most part favourable, especially during the growing season of Triumphs, and inferior seed was an important contributing cause of the small yields obtained; other causes which reduced the quantity shipped were a smaller acreage planted to Garnets and a larger proportion of that crop sold for domestic consumption. Irish Cobblers were also planted in increased quantity for the home market.

As stated on a previous page, the improvement of seed potatoes is given major attention, but a part of the Triumphs imported in the Fall of 1924 proved to be more heavily infested with leaf-roll than a part of the seed imported in the previous

Fall, and to which considerable space was devoted in last year's report.

The following quantities of Triumph seed were grown or imported for the Fall plantings:

(1) Local seed, estimated	3,000	barrels
(2) Batavia-Long Island	1,712	"
(3) Wisconsin-Long Island	1,078	"
(4) New Brunswicker	846	"
(5) Belmont	180	"
(6) Batavia	50	"
(7) Of unknown origin	25	"
Total	6,891	"

The percentages of all leaf-roll readings were as follows:

Strain.	Lowest.	Highest.	Avreage
(1)	3	12	7.2
(2)	8	74	31.6
(3)	Nil	13	3.5
(4)	Nil	5	.2
(5)	Nil	80	18.8
(6)	—	—	45
(7)	36	47	41.5

Further information regarding the history and behaviour of the strains follows:

(1) The local seed stock was grown from seed imported for March planting from New Brunswick, (600 barrels); Maine, (100 barrels); and Batavia, (50 barrels). The extremes of leaf-roll and mosaic observed, chiefly the latter, were as follows: New Brunswicker, 40 per cent. to 90 per cent; Maine, 14 per cent. to 40 per cent; and Batavia, 5 per cent. to 17 per cent. In a few cases rather high counts (up to 14 per cent) of leaf-roll were observed in the Maine stock. Seed from the March crop was planted in September. Mosaic was screened, and not more than 15 per cent. was evident, and no higher readings than 12 per cent. of leaf-roll were observed, with an average of 6.5 per cent. The early Fall (September) crop, though less seriously damaged by the very high wind of 11th, 12th and 13th November than the main Fall crop, was seriously hurt, and the yield was materially reduced by this cause. Previous to the wind storm the vines were strong and vigorous and gave promise of large yields.

(2) This stock, which had been approved by the Department, was inspected on Long Island, N.Y., on 17th June. It then contained an average of 4.2 per cent. leaf-roll, which was immediately rogued from it. The fields were large, isolated and well cultivated, and were accepted contingent on the satisfactory completion of the rogueing which was done by two representatives of the New York State College of Agriculture. Having regard to the early date on which the fields were rogued and their isolation, the subsequent behaviour of the seed in Bermuda was surprising and disappointing, and resulted in very serious loss to those who planted it. The yields varied greatly

from almost complete loss of crop to 80 pounds per rod reported by Mr. H. E. D. Smith, St. Davids. The loss in the majority of cases was greatly aggravated by wind damage, and in some cases by careless cultivation.

(3) On the recommendation of the Department, Wisconsin-grown seed was planted on Long Island for the Bermuda trade. It was inspected on 18th June, and was found to contain 1 per cent. leaf-rolled plants which were immediately rogued out. When planted in Bermuda this stock was relatively free from leaf-roll, though in many cases it had been grown beside infected fields in Long Island. The yields were good where no damage from wind or blight occurred.

(4) This strain continued to show comparative freedom from leaf-roll. It is, however, unsuitable for planting in September and early October. As most of it was planted late in the season under report, and was not subject to wind injury, it gave good yields where dusted or sprayed to control late blight.

(5) Mr. W. H. Allen, of Messrs. R. Darrell & Co. has long been interested in the introduction of a disease-free, high-yielding strain of Triumphs, and the Belmont strain is one of his introductions. The greater part of this stock showed satisfactory freedom (4.6 per cent) from leaf-roll, but about twenty-five per cent was very heavily infested (49.6 per cent). Where not injured by late blight the yields from the good stock were high. Mr. Allen proposes to give the strain further trial, and he is deserving of success.

(6) The small quantity of Hickox-Rumsey seed imported direct from Batavia contained nearly 50 per cent. leaf-roll infestation.

(7) Twenty-five barrels of uncertified seed were purchased by a farmer for his own use. A sample was planted at the Station, and contained 98.9 per cent leaf-roll and mosaic.

Very much dissatisfaction has been expressed regarding the behaviour of the Hickox-Rumsey strain. This seed was first tested here in 1921 when it contained 1 per cent leaf-roll, and gave promise of being a heavy yielding strain. In 1922 it was again planted at the Station and yielded 41 per cent higher than did Maine-Long Island stock; the percentages of leaf-roll were from trace to 12 per cent. In 1923 it was planted here commercially, and though highly infected with leaf-roll, 16.3 per cent, it cropped well. In 1924 it was an unqualified failure. During the period that this strain was grown here Messrs. Hickox-Rumsey Co. were constant in their endeavour to eliminate disease, but success did not follow their efforts.

In recent years very little loss has been caused by the rotting of Long Island grown seed through fusarium wilt which formerly caused great loss to Bermuda importers and farmers. This improvement has been largely brought about by the elimination of badly infested fields in Long Island.

As previously stated, the Wisconsin-Long Island seed gave good results. It has been planted experimentally here since 1922-1923, and always has given a good account of itself. This stock will be planted in Long Island next Spring for use in Bermuda in the Autumn of 1925.

An experimental project has been entered into with Prof. H. O. Werner of the Nebraska State College of Agriculture in relation to the improvement of Triumph seed, and the co-operation of Dr. H. C. Sands of the Maine Potato Growers' Exchange, Dr. E. E. Clayton of the New York State Agricultural Experiment Station, Geneva, and in charge of the Vegetable Research Station on Long Island, and Director H. B. Fullerton of the Long Island Railroad Demonstration Farm have been secured with the same object.

To encourage potato growing and, incidentally, to obtain information regarding comparative yields from the different strains planted, the Board, at the suggestion of Mr. B. C. C. Outerbridge, offered substantial prizes for the highest yields from sixteen measured rods. The following liberal donations were received to assist the project: Furness Bermuda Line, ten pounds; Royal Mail Steam Packet Company, five pounds; and Messrs. R. Darrell & Co., ten pounds. A number of entries were received for Triumph yields, and the competition remains open to Garnet growers.

The Director supervised the planting of potato experiments on the farm of Mr. W. R. Lightbourn, Smiths, for the Maine Experimental Station and the New Brunswick Brokers, Ltd. Dr. Donald Folsom of the Maine Station visited Bermuda in March to study the plots.

GREEN VEGETABLES.

Exports of green vegetables during the last ten years have been as follows:

1915	194,665	bushel crates
1916	252,333	" "
1917	209,894	" "
1918	63,976	" "
1919	162,517	" "
1920	260,784	" "
1921	263,649	" "
1922	191,806	" "
1923	193,974	" "
1924	280,745	" "

The quantity exported in 1924 was 45 per cent larger than that exported in the previous year, and 143 per cent of the yearly quantities exported annually during the last decade. The New York value was approximately $785,000. The average New York prices were as follows:

Beets	$1.44	per bushel crate
Carrots	1.67	" " "
Celery	7.44	" 2 bushel "
Lettuce	1.91	" bushel "
Parsley	4.90	" " "

Celery made a new record, for the quantity shipped, 33,595 2-bushel crates, was 66 per cent greater than the record made the previous year. Parsley prices also reached a record height of $12.00, and an average price throughout the season of nearly $5.00. Lettuce prices were profitable as a whole, which is unusual.

The Inspector of Produce in his report again called attention to the lack of variety in the vegetables shipped to New York. As a rule, larger quantities of fava beans, kohl rabi and turnips can be sold at remunerative prices.

ONIONS.

Exports of onions for the last ten years have been as follows:

1915	153,030	bushel crates
1916	148,221	" "
1917	132,358	" "
1918	133,141	" "
1919	131,271	" "
1920	109,072	" "
1921	49,464	" "
1922	70,874	" "
1923	35,176	" "
1924	41,848	" "

During the ten-year periods named below, the average yearly exports have been as follows:

1890	232,008	bushel crates
1900	315,715	" "
1910	279,991	" "
1920	128,670	" "

The quantity shipped during the year under report was 18 per cent larger than that shipped in the previous year, and 58 per cent smaller than the average yearly shipments of the past ten years.

The onion is a vanishing feature in Bermuda agriculture, and the only hope of reinstating it lies in Canada, and with the object of developing our trade in the Dominion The Shipment of Produce to Canada Act of 1923 was enacted.

As noted in previous reports, since the visit to Teneriffe in 1920 of Mr. E. J. Wortley, former Director of Agriculture, and Mr. W. R. Lightbourn, Vice-President of the Bermuda Green Vegetable Growers' Association, to investigate onion seed, there has been marked improvement with respect to freedom from pink and red skinned bulbs in the seed received from that source. No improvement has been effected in earliness of maturity, and as this is essential to the continuance of onion growing in the Colony, enquiries have been made and tests are contemplated with relation to California-grown seed. Mr. W. A. Moore, M.C.P. Paget, has generously offered the sum of twenty-five pounds in relation to onion investigations.

BERMUDA EASTER LILY BULBS.

The quality and quantity of Bermuda Easter Lily Bulbs **(L. Harrisii)** continue to improve. The quantities exported during the last ten years, according to the returns of the Revenue Department, have been as follows:

1915	881	cases
1916	1,224	"
1917	1,009	"
1918	823	"
1919	664	"
1920	749	"
1921	936	"
1922	1,604	"
1923	3,116	"
1924	3,539	"

More than one cause has contributed to the improvement of bulbs, and rigid Government inspection at the time of packing has not been the least important. Field inspection is highly desirable, but up to the present the Department has not been able to undertake this service.

INSPECTION SERVICES.

The inspection services of the Department continue to enlarge, and relate to all produce exported, namely, potatoes, green vegetables, onions, and lily bulbs and other nursery stock; of imported commodities the following are subject to inspection, seed potatoes, vegetable seeds, nursery stock, bananas, and live stock; to control infectious animal diseases local live stock is also subject to inspection as well as premises where animals are housed or slaughtered or meat sold, and certain local plants are subject to a form of inspection in the control of plant diseases and pests.

Produce Exported.—The attached report of the Inspector of Produce presents the details of this service. The Inspector was absent from the Colony for 135 days during which period the direction of the service was satisfactorily performed by the Assistant Inspector. A Regulation requiring a minimum number, twenty, of bunched roots per crate has proved of benefit. The subject of a standard bushel crate for green vegetables and onions came before the Board many times during the year under report, but the reform has not yet been effected.

Easter Lily Bulbs and other Nursery Stock Exported.—The Inspector of Produce inspected and certified practically all bulbs exported. Occasional exports of bulbs and other stock were inspected and certified by the Director or the Plant Pathologist in conformity with the plant quarantine ordnances of the countries to which the stock were to be exported. Subsequent to the close of the bulb season growers and packers were notified by public advertisement that in future the variety or type of bulbs must be clearly marked on the containers.

Seed Potatoes Imported.—As already stated the Triumph seed potatoes grown on Long Island, N.Y., for the Bermuda

trade were inspected by the Director. The Plant Pathologist inspected Triumphs and Garnets in New Brunswick, and Garnets in Nova Scotia. The subject is included in his comprehensive report which follows. As will be seen by the report, a further advance was made this year in the grading of Garnet fields into classes A and B. On delivery at the dock in Bermuda seed potatoes were inspected to ascertain their condition respecting rot, grading, fullness of barrels, and so on. This service was performed by the Inspector of Produce.

Vegetable Seeds.—Samples of vegetable seeds numbering 330 were tested for viability and trueness to type. With but few exceptions the seeds inspected were satisfactory in these respects.

Nursery Stock and Bananas Imported.—Importations of nursery stock and bananas are inspected by the Plant Pathologist. The erection during the year of a fumigation shed makes safer the conditions surrounding the importation of plants. Under the provisions of The Plant and Bulb Diseases and Pests Act, 1921, new Regulations were made in 1924 governing the importation of plants and the control of local plant diseases and pests.

Contagious Diseases of Live Stock.—The Government Veterinary Officer's report is attached. The soundness of the Regulations and the degree of efficiency with which they are enforced are in no small degree responsible for absence throughout the year of serious outbreaks of contagious animal diseases. Regulations dealing with the service have been amended by the inclusion of serious infectious diseases of poultry observed at the time of importation, and vaccination of imported dogs for immunization from rabies. Under the Regulations the Mallein test is required as a condition under which horses may be imported, and the importation of live poultry in crates less than fourteen inches high is prohibited.

MARKETING NOTES.

During the year under report Bermuda produce, exclusive of lily bulbs, was shipped direct to the following markets in the proportions given: New York, 91.3 per cent; Canada, 6.4 per cent; and the West Indies, 2.3 per cent.

New York.—The Inspector of Produce was in New York during the greater part of the marketing season, and his presence there was undoubtedly beneficial. He kept the Department informed by frequent cables and letters regarding market conditions, and was able in some degree to check price cutting. The information furnished by the Inspector was made public through the newspapers, post, telephone, and notices. By these means farmers were kept informed of market conditions, but many failed to profit by the information. After risking the hazards of growing a crop they refused to assume the lesser responsibility of selling it, and paid others to do this for them.

The Assistant Inspector of Produce paid a brief visit to New York in May, and it is desirable that he should visit the

market at least once every season so that he may become familiar with conditions at that end. The Department is under obligation to the Furness Bermuda Line for complimentary tickets issued to the Inspector and Assistant Inspector of Produce.

This year for the first time the chill-room space on the S.S. Fort Victoria was inadequate, and loss occurred in cargoes shipped from here in May. Representation was made to the Corporation of Hamilton, the Furness Bermuda Line, and the New York receivers for refunds on shed tax, freight, cartage and commission, but only the steamship company responded, and paid to the Board for distribution the sum of £74. 0. 10 which represented $72.15 refunded on freight and $260 as sales of empty crates. At the close of the year the adjustments had not been made pending the receipt of particulars of losses.

Largely through the offices of the Trade Development Board substantial reductions were secured in upward freight rates. A comparison of the rates in force during the seasons of 1913-1914, 1923-1924 and 1924-1925 are given below:

	1913-1914.	1923-1924.	1924-1925.
Potatoes, per barrel	50c.	80c.	65c.
Onions, per bushel crate	14c.	20c.	14c.
Green vegetables (in chill-rooms)—			
Root crops, per bushel crate	25c.	25c.	25c.
Top crops, per bushel crate	30c.	25c.	25c.
Celery, per 2-bushel crate	60c.	65c.	60c.

During the year the Board considered the recommendations of the Inspector of Produce relative to the reduction of the New York receivers of celery and the elimination of grade three potatoes. Both measures were approved by the Board, and were referred to the shippers, from whom no reply had been received at the close of the year.

Canada.—The Shipment of Produce to Canada Act, 1923, came into operation on 1st. January, 1925, and under its provisions the Board is authorized to license shippers of onions to Canada, to approve of distributors of onions in Canada, and to make, amend and repeal Regulations for the administration of the Act in detail. During the last ten years the following percentages of onions exported were shipped to Canada:

1915	7 per cent.
1916	2 " "
1917	8 " "
1918	16 " "
1919	9 " "
1920	7 " "
1921	25 " "
1922	30 " "
1923	17 " "
1924	55 " "

At the Bermuda booth of the Annual Canadian National

Exhibition Bermuda winter vegetables were brought to the attention of the Canadian public. An advertisement of Bermuda produce was inserted in a special issue of the Halifax Herald.

Home Market.—The growing tourist trade is creating an increasing demand at home for local produce. As previously stated, it is estimated that the value of local agricultural products consumed in the Colony amounted to £174,000. Though the Farmers' Market has not grown as was anticipated, it is serving a large number of people, and controls prices to the benefit of producers and consumers. During the year about 16,000 persons patronized the market. A thousand calendars and a number of mailing cards were issued to advertise the Market, and at the close of the year circular letters were mailed to hotels and boarding houses, and their co-operation in increasing the consumptoin of local produce was requested. The Poultry and Pet Stock Association aim to stimulate the production and consumption of eggs and poultry, and there is much that the Dairy Cattle Club may do to encourage the consumption of milk.

ANNUAL AGRICULTURAL EXHIBITION

The Exhibition of 1924 was held at the Agricultural Station on 9th, 10th and 11th April, and exceeded in every particular the records established the previous year. Its success was due in large measure to the invaluable aid afforded by the hundreds who assisted, and to whom the Department is under great obligation. The Exhibition is a community affair, and the community is the entire Colony.

As in former years the premium list was classified as follows: Live stock, fodders, vegetables, fruits, flowers and plants, home-made food products, and art and crafts. The list shows that the Exhibition serves many interests, and not agriculture alone. The Exhibition has out-grown the facilities now provided, and, as stated by the Chairman in last year's report, the time has come to provide ample permanent buildings and well laid out grounds. One permanent building was erected in 1924, and in it the poultry was shown. The new building and new exhibition cages gave the birds the premier exhibiting conditions.

Comparison of 1923 and 1924 Exhibitions.

Number of Entries.	1923.	1924.
Horses	74	134
Cattle	59	94
Pigs	—	—
Goats	40	28
Rabbits	30	36
Poultry	163	298
Dogs	70	101
Fodders	2	—
Vegetables	302	500
Fruits	24	56
Flowers and Plants	356	833
Food Products	346	553
Arts and Crafts	768	800
Totals	2,234	3,433
Number of prizes won, Adults	708	911
Club Members	278	550
Estimated attendance	9,000	12,000

Financial Statement

RECEIPTS.

Balance brought forward	120	13	11			
Granted by Appropriation Act, 1923	300	0	0			
Donated by Trade Development Board	37	18	8			
Donated for special prizes	42	0	0			
Advertisements in catalogue and programmes	122	9	6			
Ground rents for stalls	48	0	0			
Entry fees	44	4	0			
Poultry Association and Kennel Club	8	8	9			
Gate receipts	360	12	6			
Enclosure receipts	107	16	4			
Unpaid adult prize money	10	6	0			
Sundry	1	0	0	£1,203	9	8

EXPENDITURE.

Prizes to adults	374	12	0			
Prizes to Agricultural Clubs	83	12	6			
Prizes for sports, etc.	38	13	2			
Advertising, printing, stationery, etc.	178	15	6			
Poultry coops and benches	182	15	9			
Lumber	62	0	11			
Other material	29	8	8			
Band	50	0	0			
Teas and lunches	11	13	6			
Transportation of band and others	9	16	6			
Transportation of exhibits	7	0	0			
Labour, Field	42	4	1			
Watchmen	7	10	0			
Gate-keepers	30	15	0			
Office	27	9	3			
Police	2	0	0			
Cartage	28	12	6			
Depreciation, rental, etc. of Government stores	26	16	10			
Light, telephone and miscellaneous	9	10	10	£1,203	7	0
Balance					2	8

Donors and Winners of Special (Adult) Prizes.

LIVE STOCK:—

Local Branch of S.P.C.A., two pounds each for well cared for carriage and draft horses, won respectively by Mr. Eugene Peniston, Pembroke, and Mr. H. B. Wilson, Pembroke.

Mrs. F. B. Tompkins, one pound each for second prizes in above competition, won respectively by Mr. Augustus Simons, Paget, and Mr. James Simons, Pembroke; also one pound for well cared for trolly horse, won by Mr. H. B. Wilson, Pembroke.

Hon. John T. Trimingham, two pounds for best dairy animal, won by Mr. B. C. C. Outerbridge, Smiths.

Mr. and Mrs. J. Cameron Bradley, two prizes of two pounds and thirty shillings respectively, for grade females sired by Department's bulls, won respectively by Mr. Antone Medeiros, Southampton, and Mrs. E. York, Devonshire.

Board of Agriculture, two prizes of two pounds and thirty shillings respectively, for cows sired by Department's bulls, both won by Mr. August Teceira, Jr., Sandys; also two prizes of thirty shillings and one pound respectively for heifers sired by Department's bulls, won by His Excellency the Governor and Mrs. E. York respectively; also prize of one pound for calf sired by Department's bulls, won by Mrs. E. York.

Bermuda Poultry and Pet Stock Association, thirty shillings for utility trio, won by Mr. Roderick Christensen, Pembroke; also thirty shillings for best bird, won by Mr. F. W. Stephens, Paget; also one pound for best duck, won by Staff-Sergt. B. L. Young, R.A.M.C., Prospect; also one pound for highest points for prizes, won by Dr. O. A. Arton, Pembroke.

Mr. P. C. Hammond, ten shillings for best poultry exhibit shown by a novice, won by Mr. L. E. White, Southampton.

VEGETABLES:—

His Excellency the Governor, silver cup for highest points, won by Mr. E. W. Doe, Paget.

Mr. J. Roosevelt-Roosevelt, five pounds for best collection of vegetables exhibited by bona fide farmer, won by Mr. J. W. Lightbourn, Smiths.

Messrs. Sutton & Sons, Reading, England, silver challenge shield for best collection of vegetables and flowers grown from firm's seeds, won by Mr. T. A. Douglas, Pembroke.

Messrs. James Carter & Co., London, England, silver challenge shield for best collection of vegetables and flowers grown from firm's seeds, no award.

FLOWERS AND PLANTS:—

Bermuda Garden Club, two pounds for best novelty vine or shrub, won by Mr. J. T. Lynk, Paget.

Mrs. J. Montgomery Sears, two pounds for largest number of prizes for annual cut flowers, won by Mr. J. T. Lynk; also one pound for largest number of prizes for bulbous and tuberous rooted cut flowers, won by Mr. J. T. Lynk; also one pound for best collection of roses, won by Miss Bertha Outerbridge, Smiths; also one pound for best staged exhibits, won by Mrs. J. R. Conyers, Pembroke.

Mrs. J. Harper Poor, two pounds for best collection of perennial cut flowers, won by Mrs. T. M. Doe, Paget; also one pound for largest number of prizes won by a novice, won by Mrs. P. A. Andrews, Pembroke.

Special prizes won by members of Boys' and Girls' Agricultural Clubs are given in following section.

BOYS' AND GIRLS' AGRICULTURAL CLUBS.

Boys' and Girls' Agricultural Clubs were first organized in 1917, and though still far from perfection with respect to organization and supervision, they serve a very useful purpose, and are of benefit to the young people of the Colony.

For a part of the year under report the Clubs were supervised by Mr. S. C. Hicks, and the interest taken by him in this voluntary work was reflected, **inter alia**, in the increased number of entries made by Club members at the Agricultural Exhibition. Mr. Hicks visited nearly every school and distributed for the Department more than a thousand packages of vegetable seeds, and a fine show of vegetables by the boys and girls resulted. His Excellency the Governor generously donated two silver cups for exhibits of flowers, and others interested donated cash prizes. The names of the donors and winners follow:

LIVE STOCK:—

Mrs. Edith York, ten shillings for best dairy animal, won by Carters

McLaughlin, Whitney Institute; also ten shillings for best rabbit, won by Henry Hallett, Saltus Grammar School.

Mr. W. R. Evans, ten shillings for best bird, won by Roderick Christensen, Saltus Grammar School.

VEGETABLES:—

Mr. N. I. Bowditch, one pound for highest points obtained by boy for vegetable prizes, won by Henry Garcia, Whitney Institute; also one pound for highest points obtained by girl for vegetable prizes, won by Mary Mello, Whitney Institute.

FLOWERS:—

His Excellency the Governor, two silver cups for highest and second highest points for exhibits of flowers, won respectively by Mabel Dunkley, Bermuda High School for Girls, and Norah McLaughlin, Whitney Institute.

FOOD PRODUCTS:—

Mrs. Edith York, ten shillings for highest points for exhibits of food products, won by Mabel Dunkley, Bermuda High School for Girls.

ARTS AND CRAFTS:—

Mrs. Edith York, ten shillings for highest points obtained by boy for exhibits of arts and crafts, won by John Mackey, Mount St. Agnes Academy; also ten shillings for highest points obtained by girl for exhibits of arts and crafts, won by Nella Astwood, Mount St. Agnes Academy.

Mrs. Jas. A. Conyers, ten shillings for best white embroidery by girl of nine or ten, won by Ismay Wilkinson, Till's Hill School; also ten shillings for best plain sewing by girl of nine or ten, won by Wilymar Outerbridge, St. Marks School.

Mrs. F. B. Tompkins, ten shillings for best plain sewing by girl of ten to twelve, won by Marion West, Whitney Institute.

Rotary Club, bronze challenge shield, for highest points obtained by a Club, won by Mount St. Agnes Club, 663 points.

Comparison of Club Entries in 1923 and 1924.

Number of Entries.	1923.	1924.
Horses	4	4
Cattle	7	5
Goats	36	22
Rabbits	27	30
Poultry	43	37
Dogs	14	25
Vegetables	79	264
Fruits	1	30
Flowers and Plants	50	194
Food Products	196	278
Arts and Crafts	436	666
Totals	893	1,555
Number of Clubs competing	24	28
Number of prizes won	251	550

The results of the year's Corn Contests were disappointing, for though weather conditions were favourable throughout the summer, only 36 ten-ear exhibits were sent in, and but three entries were received in the yield contest.

The winners of the silver cups are given below:—

Cup presented by the Bermuda Green Vegetable Growers' Association for best ten-ear exhibit grown by a boy, Joseph Soares, Cavendish Hall School, Devonshire.

Cup presented by Hon. W. E. Jackson, C.M.G., for best ten-ear exhibit grown by a girl, Florence Thomas, Warwick Academy.

Cup presented by Hon. J. P. Hand, M.B.E., M.C.P., for largest yield: Edward Hall, Warwick Academy.

In addition to the silver challenge cups, prizes of the value of £6. 13. 6 were awarded to 34 competitors who represented 14 Clubs.

VISITS TO FARMS, ETC.

During the year 605 recorded visits were paid to farms and gardens by members of the Department. The number was below the yearly average, for the Director, Plant Pathologist and Inspector of Produce were collectively absent from the Colony 292 days. In no other way can the Department keep closely associated with the farming community and afford help in the problems of the individual farmer, and it is regretted that it was not found possible to pay more visits than is recorded above.

Meetings.—Only two farmers' meetings were held, in Southampton and Devonshire, both were addressed by Dr. Donald Folsom of the Maine Experimental Station and members of the Department. Other meetings associated with agriculture were attended by the Director, namely, Green Vegetable Growers' Association, Poultry and Pet Stock Association, Dairy Cattle Club, and Garden Club.

Somerset Flower Show.—Members of the Department were in attendance at the Annual Somerset Flower Show. The Plant Pathologist staged an instructive exhibit illustrating plant diseases and pests and methods of control. Flowers and plants were exhibited by the Department.

PUBLICATIONS.

Five hundred copies of the Agricultural Bulletin were issued monthly. Five hundred copies of the Annual Reports for 1923 were printed for distribution. Seven hundred copies of the Catalogue of the Annual Exhibition were distributed. The Plant Pathologist contributed regularly to the columns of the local press, and occasional articles were contributed by other members of the Department. Appreciation is here expressed of the courtesies extended by the Royal Gazette and Colonist Daily and The Mid-Ocean.

FARM LABOUR.

Despite the admission into the Colony since March, 1923, of 409 immigrants from the Azores, the majority of the men, numbering 270, being farm labourers, there still exists a shortage of labour for agricultural work, for other activities have absorbed many of the immigrants. The agricultural labour problem is not easily solved, and the importation of labourers should

not be considered the only solution. The following should offer some amelioration, better housing on farms, better farm management by which available labour will be better utilized, and the division of large farms into small holdings.

FARM LIVE STOCK.

This subject is dealt with in the report of the Government Veterinary Officer, and lengthy discussion is unnecessary.

Horses.—The number of horses has increased and the quality improved during the last few years chiefly because of the growing tourist trade. Very little horse breeding is carried on in the Colony, and the majority of the horses are imported from New York.

Cattle.—The improvement of dairy cattle continues, especially of Guernseys. There are now in the Islands many registered animals of this breed, and the number of grade females is increasing rapidly. Holsteins and Jerseys include a few registered animals. Late in the year the Bermuda Dairy Cattle Club was organized, and should prove a very useful institution.

Pigs.—There is little pure bred stock in the Colony. Feeders are not agreed as to the profits from pig keeping, but it may be assumed that cheap feed in the form of hotel swill or farm grown sweet potatoes and the like, and thrifty early maturing stock are essential to success. Often pigs are fed too long to give the maximum profit.

Goats and Rabbits.—As already stated, the Department has imported a registered Toggenburg buck goat, for there exists a decided need for goats, especially in crowded areas in Pembroke and elsewhere. Rabbits are seldom raised for table use. Were it not for prejudice, they would provide an excellent and cheap food.

Poultry.—Reference has already been made to the admirable work being done by the Poultry and Pet Stock Association, which is encouraging the breeding not only of exhibition poultry but of production or utility stock also. Its attitude is well expressed in the following epigram, "To make the useful more beautiful and the beautiful more useful is the highest aim of the poultry breeder." At the general meeting held in December, committees were appointed to enquire into and report on the following: (1) Control of poultry diseases, (2) registration or certification of flocks, (3) production and marketing of table poultry, (4) sale of breeding stock in the West Indies, and (5) production of winter eggs and disposal of surplus spring eggs.

DIRECTOR'S VISIT TO ENGLAND, FRANCE AND JERSEY.

The Director left Bermuda for New York, en route for Southampton, England, on 14th June, and returned to Bermuda, via New York, on 19th September. A full report of the visit has already been submitted, and a brief presentation of salient features connected therewith is here presented.

Imperial Botanical Conference.—As the Colony's representative the Conference was attended throughout its length. Slightly more than one hundred addresses and papers were presented and all were related more or less closely to the practical problems associated with agriculture, forestry and kindred industries. Subjects relevent to Bermuda agriculture were discussed, and information of value was obtained. Great benefit was derived from association with men engaged in the development of agriculture at home and in other parts of the Empire.

Sale of Bermuda Produce in England.—The sale of produce in England was enquired into, and many efforts were made to stimulate interest in Bermuda Easter lily bulbs. It is unfortunate that the only large consignment of bulbs arrived in England so late that it was not accepted. There exists a potential market, and its developpment depends less on price than on quality. Indirect enquiries were received regarding arrowroot starch, and the matter is being looked into. At the present time there appears to be no demand for other kinds of Bermuda produce.

Observations on Cultural Methods.—Cultural methods were observed, and information secured, particularly regarding French gardening and the growing of tomatoes in Jersey.

Observations on Marketing Methods.—Markets large and small were visited, and methods observed.

Investigations Regarding Celery and Other Seed.—Two large French seed houses, namely, Messieurs Vilmorin-Andrieux et Cie, Paris, and Monsieur L. Clause, Bretigny-sur-Orge, were visited, and enquiries made regarding their strains of Golden Self-Blanching celery. The first-named firm's seed known as "old strain" was almost exclusively planted in Bermuda a few years ago, and gave satisfactory results, but their "new strain" has not proved as well suited to local conditions. The second firm's seed has been very popular here during the last two or more years. The interviews with the two firms brought out the following information: (1) Messieurs Vilmorin-Andrieux et Cie will offer their "old strain" in quantity next year, (2) Monsieur L. Clause has large quantities of his strain under cultivation, (3) both firms strongly recommend the purchase each year of seed from the previous year's crop, as seldom will the current year's seed be harvested in time to be shipped here sufficiently early. This last item of information was cabled to Bermuda, and failure on the part of importers to act on it resulted in a shortage of seed. Other kinds of vegetable seeds were selected from the two French houses named and from Messrs. Sutton and Sons and Messrs. James Carter and Co's. stocks.

Enquiries Regarding Agricultural Supplies.—Many enquiries were made regarding agricultural supplies, especially fertilizers, and the information obtained should prove of advantage to purchasers.

British Empire Exhibition.—The Bermuda Pavilion at the British Empire Exhibition was used as headquarters, and was found convenient, for many of the firms interviewed were

represented at Wembley. During the short interval between the departure of Mr. H. J. Tucker and the arrival of Mr. T. St. G. Gilbert the management of the Pavilion was assumed. It should not be out of place to state here that the Bermuda Pavilion was highly creditable to the Colony, though full advantage of it as an advertising medium was not made.

Imperial Institute.—The Imperial Institute was visited and a full report was submitted to the Trade Development Board regarding the Bermuda Court.

PERSONAL.

During the year under report the death occurred of one long and intimately associated with the Board and Department, namely, Lt.-Col. W. R. Winter, O.B.E., J.P., who, as Chairman of the Board, Acting Director and in other capacities did much for Bermuda agriculture.

STAFF.

The Director of Agriculture, Mr. E. A. McCallan, was absent from the Colony on duty from 14th June to 18th September, during which time he visited the United States, England, France, and Jersey, and represented the Colony at the Imperial Botanical Conference held in London on 7th to 17th July. The Director was reappointed a member of the Immigrant Labour Board.

Mr. L. Ogilvie, Plant Pathologist, represented the Colony at the Inter-Colonial Conference held at Jamaica on 28th January to 2nd February. Mr. Ogilvie was absent from the Colony from 14th January to 14th February. During the Director's absence from the Colony Mr. Ogilvie was Officer-in-Charge from 14th June to 21st. July and from 18th August to 18th September. He was absent from the Colony from 22nd July to 17th August for the purpose of inspecting seed potatoes in New Brunswick and Nova Scotia, and to attend (at his own expense) the Conference of the British Association for the Advancement of Science held in Toronto.

Dr. R. L. Tucker, Government Veterinary Officer, was reappointed a member of the General Board of Health.

Mr. G. E. Winter, Inspector of Produce, was absent from the Colony and on duty in New York from 19th January to 3rd April, and from 24th April to 22nd June. Mr. Winter was Officer-in-Charge from 22nd July to 17th August.

Mr. G. L. Young, Clerk, was absent on leave from 9th. to 18th June, and from 16th August to 15th October. During the first period the post of Acting Clerk was held by Miss Lydia L. McCallan, and during the second period by Miss Mabel B. Smith.

Mr. E. L. Adams, Assistant Inspector of Produce, was in charge of the inspection service during the absence of the Inspector. The Assistant Inspector was absent on duty from 24th to

29th May, when the Senior Sub-Inspector, Mr. F. W. Williams, was in charge.

On 30th December, Mr. W. R. Evans, Clerk and Chief Inspector of the Medical and Health Department, was appointed First Agricultural Assistant with effect from 1st. January, 1925.

FINANCIAL.

The expenditure of £4,765 was authorized by the Appropriation Act of 1923 and Resolve 6 of 1924. Of this amount the sum of £4,515. 10. 8 was expended, and a balance of £249. 9. 4 remained unexpended. The sum of £182. 19. 3 was received from sales and other sources and was reimbursed to the Treasury. Statements of the expenditure under all sub-heads and of the receipts will be found in the Appendices.

During the last ten years the expenditure by the Department, exclusive of salaries, and the receipts have been as follows:

Year.	Expenditure.	Receipts.
1915	£2,529 18 0	£ 89 3 4
1916	2,497 19 0	163 18 10
1917	2,045 5 7	156 2 10
1918	2,051 8 0	376 3 4
1919	2,722 5 8	157 18 0
1920	3,126 6 6	209 4 6
1921	5,488 15 2	176 1 11
1922	6,905 18 2	68 17 4
1923	4,163 6 10	73 0 11
1924	4,515 10 8	182 19 3

Respectfully submitted,

E. A. McCALLAN,
Director of Agriculture.

Agricultural Station, Bermuda,
26th February, 1925.

Report of the Plant Pathologist for the Year 1924.

The Director of Agriculture,

I have the honour to submit the following report of work done during the year 1924.

GENERAL REMARKS.

The year's investigations were somewhat interrupted by various circumstances, my absence from 14th January to 15th February in the West Indies and the United States, the responsibility incurred in taking charge of the Department from 14th June to 19th September (exclusive of my absence on potato seed inspection from 22nd July to 18th August) and by alterations to the office buildings. With regard to the last point I have to thank the Board and yourself for the increased accommodation afforded me, which has made the work much easier.

I have here to record my thanks to the Imperial Bureau of Entomology and Mycology respectively for their assistance in the identification of specimens and for supplying literature, to numerous Plant Pathological institutions in the United States and throughout the world for information generously supplied, and the Board of Agriculture, the Department and farmers generally for their co-operation.

Details of the work accomplished have been submitted in monthly reports and only a summary will be given here.

Much attention has been given to the control of plant diseases and pests. The methods recommended by Prof. Whetzel and largely adopted by the farmers before my arrival have been found in the main quite ample and satisfactory, but too often the pathological condition is allowed to progress too far before any attempt at control is made. It is imperative that **preventive measures** must be practised on practically all the crops grown here and a regular system of such measures must be followed. I have endeavoured to keep farmers alive to these facts. Dusting as a substitute for spraying has on the whole proved quite satisfactory, but care is necessary that the dust be applied when the plants are wet with dew or rain, that it be evenly distributed, and that the dusting machine be maintained clean and in good working order. A schedule of the chief dusts and sprays which have proved of value here appeared in the July Bulletin. The difference between profitable and unprofitable farming in Bermuda is largely determined by the care the farmer takes in the preventive measures already mentioned, in careful tillage and weeding to keep his crops in vigorous growing condition and to keep down the wild host plants of insects and fungi, in some attempt at rotation of crops, and in seasonable application of fertilizers.

One of my chief endeavours has been to safeguard the Islands effectively from further importations of diseases and

pests. With a view to this a substantial fumigation shed has been erected at the Station. Very careful inspection has been carried out of all plants, bulbs and banana fruit imported. Most of the importations of seed potatoes were inspected personally by me. 297 parcels were inspected at the Post Office throughout the year, 54 crates of plants at the docks, and eight consignments of banana fruit. Fourteen fumigations were carried out. Twenty-one consignments of plants and bulbs for export were examined and certified by me. New regulations under The Plant and Bulb Diseases and Pests Act were recommended and were approved by His Excellency the Governor in Council on the 11th June.

MAJOR INVESTIGATIONS.

Major investigations included the identification of the injurious insects of Bermuda, which have hitherto been practically unknown. A permanent collection is being prepared for reference. I am indebted to Mr. F. F. Payne of Toronto for his help in the collection of insects.

The diseases of bananas, potatoes, celery, lilies and fruit trees have received special attention. A special report was submitted to the Board in February relative to the possible importation of the Panama Disease of Bananas (summarised in the February number of the monthly bulletin). An article on celery disease in Bermuda appeared in the June number, and the first half of a detailed article on leaf-roll of potatoes in the December issue.

EDUCATIONAL.

Personal visits have been paid to farms and gardens as frequently as possible. The total number of visits paid throughout the year was over 200. Many enquiries were received by letter and telephone. A small number of farmers' meetings were addressed throughout the year and exhibits and talks presented to the Bermuda Garden Club and the Pembroke Arbor Society. Much time was taken up in the preparation of exhibits for the Annual Agricultural Exhibition and Somerset Flower Show. These attracted considerable attention. Articles dealing with the control of plant diseases and pests have been prepared month by month for the Agricultural Bulletin. I have to thank the editors of the "Royal Gazette and Colonist Daily" and "The Mid-Ocean" for their favour in printing seasonable articles which have appeared week by week in these newspapers, and have proved valuable in drawing attention to diseases and pests prevalent at the time and to the control measures to be employed. The new notice board at the docks is being made use of in drawing the attention of farmers to necessary control measures.

INTER-COLONIAL CONFERENCE, JAMAICA.

I had the honour of attending the West Indian Agricultural Conference held in Jamaica from 28th January to 2nd February as representative from Bermuda. A detailed report of the work accomplished was submitted to the Director of

Agriculture and only a summary will be given here. On the way South I was enabled, through the courtesy of Mr. Albury, Chairman of the Board of Agriculture of the Bahamas, to pay a short visit to the district round Nassau and to make myself acquainted with the agricultural conditions in the Bahamas generally.

The two short addresses submitted by me to the Inter-Colonial Conference recommended (1) Government inspection and certification of exports of nursery stock, to control the dissemination of plant diseases and pests and (2) Government inspection of exports of fruit and vegetables to control the dissemination of plant diseases and pests, and to secure uniformity and improvement of the grades exported. With regard to the first point the feeling was that the time was not yet ripe in the West Indies for any such co-operative action as that suggested and that for the present each of the colonies must take her own precautions against the importation of dangerous diseases and pests by means of absolute quarantines and careful inspection and fumigation.

The second recommendation was coupled with an account of the inspection and grading systems in force in Bermuda and was put forward in the hope that Jamaica and the West Indies generally might glean some information which might be of use to them in the marketing of fruit and vegetables. The advantages to be gained from a line of fast boats supplied with refrigerators plying between the West IIndies, Bermuda and Canada was pressed and received warm support. The generally poor condition of West Indian fruit arriving in Bermuda was emphasised.

The opportunity was taken in Jamaica of investigating the possibilities of markets for Bermuda vegetables and lily bulbs, ornamental trees and plants which might be of value here, the plant quarantine and inspection methods, the methods of fumigating imported plants, the question of the transmission of alastrim on the wrappers of fruit, methods of combating plant diseases and pests, and agricultural conditions generally.

The Conference was mainly of technical interest, but the opportunity of meeting the agricultural officials of most of the West Indian Islands was of the greatest value. I have to acknowledge my indebtedness to these and to many of the agricultural and commercial gentlemen of Jamaica for their kindness and assistance.

I returned home via New York and paid a visit to Cornell University, Ithaca, where I spent a very profitable few days with Prof. Whetzel and his staff, who gave me much valuable information. In New York I was able, through the kindness of Mr. G. E. Winter, Inspector of Produce, to see something of the marketing conditions.

POTATO SEED INSPECTON IN NEW BRUNSWICK AND NOVA SCOTIA.

A full report on seed potato inspection was submitted to the Board of Agriculture in August. The following remarks may be of general interest.

The condition of the Garnets in New Brunswick was good, despite a month of hot and dry weather previous to inspection which was very conducive to damage by the Colorado Potato Beetle (Leptinotarsa decemlineata). There was a high percentage of misses, apparently due mainly to cutworms. The average leaf-roll percentage was 0.3.

The Triumphs for late planting showed an average of about 20% mosaic, while leaf-roll was practically absent. The Triumphs for early planting were to be dug about the 4th of August. The average percentages of leaf-roll and mosaic were 0.7 and 7.4 respectively. The plants were vigorous and were to be rogued for weak hills. The New Brunswick Brokers, Ltd. are endeavouring to work up a reliable stock by means of tuber units.

The dry weather also adversely affected the Chili Garnets in Nova Scotia, but on the whole the crop was very good. The best fields were excellent with a very even growth. The worst fields were badly injured by the potato beetle and a plant bug (Lygus sp.).

Mr. W. K. McCulloch, the Provincial Inspector, and I decided to make a slight change in the usual procedure. The fields which were passed were divided into two classes, A and B. The orders were filled from A, the best ones, before B was drawn upon.

Of the fields condemned three failed to pass on account of black-leg, the limiting percentage of which is 3, six on account of foreign varieties (3%), one on account of leaf-roll (2%), and three on account of large percentages of disease combined with general poor condition.

Below is given the number of acres inspected and other information:

District.	Total.	A.	B.	Condemned.
Masstown.	16½ acres.	13 acres.	3½ acres.	
Windsor	13¼ "	9¼ "	3 "	1 acre
Cornwallis	38 "	28 "	—	10 "
Clifton	101¾ "	72¼ "	13¼ "	15¾ "
Totals	169½ "	122½ "	20¼ "	26¾ "

As a whole the Garnet situation in Nova Scotia is distinctly hopeful. Mr. McCulloch, the Provincial Inspector, whose energy and tact and knowledge of his subject have impressed me as they have former inspectors from Bermuda, has succeeded in interesting the farmers in potato diseases, with the result that the more careful among them have developed stocks which in some cases would be hard to beat anywhere.

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

From 6th to 14th August I attended (at my own expense) the meetings of the British Association for the Advancement of

Science at Toronto, associating myself principally with Section K (Botany).

EXHIBITION MATERIALS.

Some time was spent in the early summer in making up collections of preserved vegetables and dried endemic plants for the British Empire Exhibition.

CHIEF PLANT DISEASES AND PESTS OBSERVED DURING THE YEAR

Avocado.—The coconut mealy-bug, **Pseudococcus nipae** (Mask.), frequently causes severe injury to the tips of shoots. Pruning and spraying the trees with oil emulsion during the winter months is recommended.

Chrysomphalos dicytospermi Morg., a scale insect destructive in Florida, is occasionally found on leaves and twigs.

The Pyriform scale **(Pulvinaria pyriformis Ckll.)** is not uncommon on avocado leaves, but is of little importance.

A troublesome dieback of the twigs associated with a fungus of the genus **Gloeosporium** is possibly identical with that described from Florida. The disease can be overcome to a large extent by pruning out and burning the dead wood.

Observations suggest that the frequent failure of the avocado to set fruit in Bermuda is due (1) to the planting of seedlings instead of budded stock, (2) to failure to keep the trees headed down when they are young so as to encourage a low bushy form, (3) to failure to control the insects and fungoid diseases referred to above and in my 1923 report. The effectiveness of root pruning and girdling was demonstrated here by experiments carried out in 1905, and observations show that fruit is usually borne on trees whose roots are restricted in some way. The importance of a sheltered, moist situation is amply borne out.

Bamboo.—Little injury was noticed this year from the shoot rot described by Whetzel (Rept. Bd. and Dept. Agr. Bermuda 1921).

Banana.—(Musa Cavendishii). Further observations on the unthrifty condition of bananas referred to in my 1923 report, page 29, confirmed the conclusions arrived at.

A somewhat serious pathological appearance on banana fruits was reported on 16th August, after a spell of very wet weather, and was afterwards found to be common all over the Islands. The disease is first apparent on the very young flowers while they are still enclosed by the bracts. These show a black discolouration and very frequently a woolly fungus growth. Subsequently the black discolouration, which first affects the pistil and anthers, works back to the developing fruit, the tips of which become black. As the fruit becomes older an active

fermentation sets in, accompanied by gumming, and subsequently the rot progresses down the banana fruit, often about half-way, and the fruit becomes yellow prematurely.

Organisms associated with these symptoms are as follows: (1) A tineid moth (as yet unidentified). The tips of the fruit in diseased plantations are very often bruised and covered with the silky threads and frass associated with the caterpillars of this moth. (2) The aphid **Pentalonia nigrinervosa** Coq. This is very frequent and is attended by ants. (3) The common flat-shelled snail (probably **Polygyra appressa** Sag.) was very commonly found on the fruits, especially after rain. The silvery trails of the snail were found all over the fruits and stalks. Experiments performed with these snails showed that they were not primarily responsible for the trouble. (4) Various beetles, **Carpophilus dimidiatus F., Sericoderus** sp., and **Atheta coriaria** Kr., and pomace-flies (**Drosophila** spp.) and various mites attacked the fruits when decay was well advanced. (5) Three fungoid organisms were isolated from the black tips of the fruits, but none of these have as yet given rise to the typical symptoms when inoculated into healthy fruit. There is no evidence that the fungus **Gloeosporium musarum** is the cause of the disease although this is frequently associated with the later stages of decay.

There is evidence that this disease has been destructive here in former years during periods of excessive humidity.

Control measures recommended were: (1) The disposal of badly affected fruit by burning it. (2) Cutting off the decaying tip of the inflorescence. (3) Avoidance of undue humidity in the plantation by proper spacing, drainage, etc. (4) Spraying the young fruit with Pyrox was found to be fairly efficient as a protective measure.

A marked improvement was apparent in the condition of the fruit from the beginning of October onward, consequent on improved weather conditions.

A somewhat serious attack of the semi-tropical army worm, **Xylomyges (Prodenia) eridania** Cram. was reported in June, and was brought under control by the use of arsenical sprays. This pests, one of those known in Bermuda as "fireworms," does extensive damage to potatoes, celery, beets, corn, squashes, lettuce, spinach, cowpeas, tomatoes, and many ornamental plants throughout the year. It breeds extensively during the summer on "Calulu" **(Amaranthus hybridus).**

Beans.—The rust **Uromyces Phaseolorum (U. appendiculatus)** was found on the fava beans in May and the powdery mildew **(Erysiphe polygoni)** on string beans throughout the year.

Much damage was done to seedling string beans by "hoglice" (probably **Amadillium vulgare** Latr.) Arsenical and potassium bichremate poison baits were of little use. Repeated sprayings with arsenate of lead (powder) solution (2lbs. to 40 gallons) protected the plants till they had outgrown the attacks.

Beet.—The fungus **Cercospora beticola** was present on beet leaves in considerable quantity during March and April. It proved of little importance however as it occurred only towards the end of the growing season.

Zinckenia (Hymenia) fascialis Cram., the Hawaiian beet webworm, and **Xylomyges eridania** (see above) were very prevalent on the early beet crops during November and December. Their control by the use of arsenicals is an easy matter.

Carrot.—Young carrot plants were severely attacked in November by cutworms, which proved to be **Feltia subterranea** F. a southern species. This is probably the commonest cutworm in Bermuda, although **Prodenia ornithogalli** Guen. is frequent during the winter months.

Celery.—**Septoria apii** occurred extensively in the celery fields from March onwards, but was kept in check where spraying was carried out. Celery seed imported this year was found to be practically free from late blight pustules. Early blight (**Cercospora apii** (recorded in the report of 1916-1918) was noticed early in May in many fields throughout the Islands. It is of little economic importance in Bermuda. "Black Heart" occasioned losses up to 75% in certain fields and was particularly common on certain varieties with open tender hearts. The disease is commonly associated with plants going to seed. The causative soft-rot bacteria readily penetrate the thin walled cells of the bleached heart leaves. An incipient soft rot is started and the rotten material is invaded by certain characteristic species of flies, (notably **Dohrniphora divaricata** Ald. (Phoridae)), whose larvae quickly mine the tissues. There is little doubt that the disease is carried from plant to plant by these flies. The excessive use of nitrate of soda brings about a soft condition in the plants which makes them very liable to the disease. The bug **Lygus pratensis** was common in the celery fields in June.

Corn (Maize).—The small leaf hopper, **Peregrinus maidis** Ashm. (Fulgoridae), is commonly found on the inner sides of the leaf sheaths of corn, and is the cause of the red streaks on stems and leaves and of their premature dying off and the failure of the ears. No control methods were tried but Mr. Gowdey of Jamaica informs me that practically any of the contact insecticides are efficient if applied early in the morning or in the late afternoon, and if repeated in order to deal with successive broods.

Corn in a small planting was badly affected by **Helminthosporium** sp., causing long dry streaks on the leaves.

Cabbage.—The caterpillars of the moth **Phytometra (Autographa) brassicae** Riley proved to be rather destructive to cabbages during November and December. Dusting with arsenate of lead dust before the plants were headed was recommended.

Citrus.—In addition to the diseases and pests recorded by Prof. Whetzel and in my 1923 report, the following are of some importance: **Colletotrichum gloeosporioides** is common on citrus generally, especially when badly cared for. **Aphis gosypii** Glov.

commonly attacks the young leaves, especially the so-called "water sprouts." It is kept under control by an internal parasite **Aphidius (Lysiphlebus) testaceipes** Cress. The scale **Dinaspis annae** Malen was found to be common on trees at Orange Valley. Silvering and russeting of the fruits from the attacks of mites is of frequent occurrence. **Icerya purchasi** Mask., the Cottony Cushion Scale, is frequently abundant but is kept down by the predator **Novius cardinalis** Muls., introduced here in 1902. The cottony cushion scale is also very common on acalyphas.

The citrus orchard at the Station was sprayed with Yother's miscible oil emulsion on 2nd. June, 1st September and 10th December. A crop of 600 grapefruit was gathered in excellent condition. Small quantities of oil emulsion have been distributed to citrus growers free of charge.

Through the courtesy of the Florida State Entomologist I received cultures of red and yellow aschersonia fungi for the control of the cloudy-winged white fly (**Dialeurodes citrifolii** Morg.). The trees to the left of the gate were sprayed with a suspension of the former on 16th July, and those to the right with the latter on the 19th. The red fungus can now be seen in small numbers on the whitefly, but the yellow fungus has not been seen.

The weevil **Diaprepes famelicus** Ol. subsp. **esuriens** Gyl., of considerable importance on limes in Antigua and reported here by Verrill, brings about considerable defoliation of citrus trees, surinam cherry, bougainvillea, etc., and caused rather severe damage to sweet peas in November. The pest was brought under control in the latter case by handpicking (it congregates in great numbers in the hearts of rose flowers), by clean cultivation, and by spraying the young plants with a strong arsenical solution.

Egg-plant.—The larva of the pyralid moth **Psara periusalis** Wlk. is found here on the leaves of tomato seedlings under glass and of egg-plants. It can be controlled by means of lead arsenate dusts or sprays applied early.

Fruit Fly (Ceratitis capitata).—Preparations were made in June for the importation of fruit fly parasites from Hawaii, but unfortunately arrangements fell through. The Department is indebted to the Federal Horticultural Board, Washington, and to Dr. Fullowway, Hawaii, for their courtesy in this matter.

Extensive damage was done to oranges by the fruit fly in the Baileys Bay district during April and May. The late loquat crop was badly infested but the trees at the Station which had been sprayed with Mally bait produced a practically clean crop. Chili peppers and guavas were badly infested in November.

Grape.—Powdery mildew (**Oidium**) and anthracnose (**Gloeosporium ampelophagum**), the latter producing "birdseye" spots on the fruits were common throughout the summer. The latter disease, reported by Harris in 1905, is rarely serious. The former is controlled by frequent dustings with sulphur.

Guava.—The larva of the Eucosmid moth **Spilonota smithiana** Wals. injures young shoots of guava very considerably. It

can be controlled by applications of arsenical sprays or dusts in early spring and at intervals throughout the year.

Lettuce.—Sclerotinia libertiana has been responsible for much damage to the lettuce crop, as in former years. This fungus is also common on certain ornamental plants such as marigolds, arctotis grandis, sweet sultan, larkspur, and snapdragons and has been found on carrots, celery and faba beans.

Lilies. (Lilium Harrisii).—Serious loss occurred from attacks of Botrytis blight in certain fields during very damp weather in April and early May. The fungus developed saprophytically on heaps of withered flowers which had been left lying at the sides of the fields and thence swept like a fire over the lilies. The course of the disease on the plant is as described by Marshall Ward on Lilium candidum in 1888. The lowest leaves were first affected. There was no evidence that any damage was caused to the bulbs. The fields referred to had not been sprayed. Other fields systematically dusted with copperlime dust or sprayed with Burgundy or Bordeaux mixture remained clean.

Much attention has been paid to the disease of lilies. Investigations are not yet complete, but the following points are of interest. Bulbs showing "basal rot," which is rigidly excluded at inspection time, produced in 50 per cent of the cases the condition referred to provisionally as "mosaic" in my 1923 report, namely, pale longitudinal stripes which subsequently develop a scorched appearance and dying off of the leaves from below upwards. The cause of the rot has not been discovered. Letters received from America indicate that this disease is troublesome there.

The stump-rot disease (Whetzel 1921) is adequately controlled by spraying with soda-Bordeaux or lime-Bordeaux and by dust.

The condition referred to as "yellow flat" in my 1923 report appears to be of more importance in certain fields than the other diseases referred to.

Bulbs gathered from plants showing very marked chlorosis, a condition common in Bermuda, have produced healthy plants this season when grown in ordinary soil.

As far as work has already gone, the following cultural methods are recommended as of the highest importance: (1) The planting of vigorous strains. These will usually outgrow the root trouble mentioned above. (2) The discarding of all bulbs showing any evidence of basal rot. (3) Avoidance of shallow soils with an excessive lime content. (4) Very careful attention to spraying or dusting for "stump-rot" and Botrytis throughout the season. (5) Burning of decaying flowers and other refuse from the lilies.

An aphid, not yet definitely identified, but near **Aphis gosypii**, infests the heart leaves of the lily shoots and was of

importance in certain fields in December. It also occurs frequently in large numbers on bulbs which have been stored beyond the usual planting time. It was brought under control in the field by dusting the plants with nicotine dust.

Oleander.—The incidence of the oleander scale (**Aulacaspis pentagona** T.T.) has been considerably checked by the parasite **Aphelinus diaspidis** Howard introduced from Italy (see previous reports). Observations show that the parasite is now widely spread throughout the Islands. There have been periodical outbreaks however which in some cases looked threatening and which have been kept down by spraying with "soluble sulphur" (Niagara), 1-25. The power pump belonging to the Department has been used in this work. Through the courtesy of Prof. Silvestri, Italy, two predatory ladybird beetles **Chilocorus bipustulatus and Rhizobius lophantae** were included in a further consignment of **Aphelinus** infected twigs sent during the spring. The former was bred in the greenhouse and proved a very active predator of Aulacaspis pentagona. Plantings of the beetles outside however have apparently failed to become established.

During March and April the oleander aphid (**Aphis nerii** Kalt.) was frequently reported on the tips of oleander shoots and dusting with nicotine dust was resorted to. With the advance of the season however it became practically entirely parasitised by **Aphidius testaceipes.**

Onion.—No case of onion blight (**Peronospora Schleideniana**) came to my attention, despite a wet season. Damage by thrips was slight. The value of one application of nitrate of soda against pink-root (**Fusarium malli**) was clearly evident. In one field half the onions were so treated with the result that in the untreated half serious yellowing of the tips took place about a month before it occurred in the other half. Disastrous effects followed the planting of onions in shallow exposed soil which had borne an infected crop the year before.

Ornamental Plants.—Antirrhinum rust (**Puccinia antirrhini**) was again prevalent in several localities. Attempts to control the rust by dusting with sulphur were unsuccessful. Growers are urged to pull up and burn plants infected with this rust as soon as it is detected. The following were of some importance: leaf miners (**Agromyza** spp.) on aster and chrysanthemum leaves, **Aphis pseudobrassicae** Davis (?) on stocks, (parasitised by **Aphidius testaceipes**), **Diaprepes** on sweet peas (see above), the fungus **Phyllosticta violae** on violet leaves, **Botrytis** sp. on rosebuds, **Uromyces Caryophyllinus** on carnations, and **Puccinia chysanthemi** on chrysanthemums.

Palmetto.—The scale **Comstockiella sabalis** Comst. still continues to give trouble, but careful inspection and spraying have kept the infected areas isolated. A picturesque clump of trees on St. David's Island was found to be badly attacked in September and strenuous efforts have been made to save them.

Papaw.—**A Gloeosporium** disease of papaw fruit was serious in early December. The destruction of infected fruit was recommended.

Potato.—Late blight became prevalent towards the end of March on the Garnet crop. Early blight was prevalent in the fall crop by the end of November.

Details of the prevalence of leaf-roll in part of the fall (Triumph) crop are given in the Director's report. The percentage of leaf-roll had increased some fifteen times since the inspection on Long Island. It should be noted that inspection and rogueing took place almost as early as it was possible to distinguish diseased from healthy plants. A comprehensive article dealing without present knowledge of the disease and setting forth certain recommendations was prepared and appears in the December and January (1925) bulletins.

Insects recorded from potatoes during the year include the green looper caterpillar **Phytometra oo** Cram. which is largely parasitised, the aphid **Macrosiphum solanifolii** Ashm., the leafhopper **Empoasca mali** LeB., **Lygus pratensis** L. and cutworms.

Experiments carried out with Rosa's nitrate of soda treatment to hasten sprouting in Triumphs imported from New Brunswick did not give satisfactory results.

Squashes, Water Melons, and Cantaloupe Melons.—The melon borer **Margaronia hyalinata** L., mentioned in the 1916-18 report, is the cause of almost total loss of cantaloupe melons throughout the summer months. The pest may be controlled by careful dusting or spraying of the leaves with arsenical poisons before the fruits are formed. The caterpillars feed on the leaves before entering the melons.

The downy mildew of cucurbits, **Peronoplasmopara cubensis** (B. & C.) Cl., was prevalent in the fields late in May and was the cause of premature dying down of the Station crop of squashes. This disease should be anticipated by the use of preventive measures beginning when the plants are very young, the most effective fungicide to use being Bordeaux mixture. It is practically imperative to spray or dust during damp cloudy weather. The powdery mildew **(Erysiphe cichoracearum)** is liable to be confused with the above. Its attacks are not serious here.

Scale Insects.—The collections of Prof. Whetzel and myself show that there are about 40 different species of scale insects on the Islands. It is hoped that a list of these will be published when their host plants have been more fully investigated.

Insects Intercepted.—The following insects were among those intercepted: **Fiorina fiorinae** T.T. on plants from the Azores, **Pachymerus gonager** F. on seeds from India, **Aspidiotus destructor** Sign. on several importations of palms from the West Indies.

The moth **Loxostege similialis** Guen. was recorded from my collections in Bermuda, but I have not identified its food plants.

Introduction of Parasites and Predators.—In addition to those already mentioned the possibility of the introduction of

parasites or predators of Hymenia fascialis, Comstockiella sabalis,, and other insect enemies is being investigated. Mr. H. A. Snyder of Philadelphia kindly forwarded me several egg cases of Praying Mantis, but after some consideration I decided not to introduce this insect.

Respectfully submitted,

LAWRENCE OGILVIE,

Plant Pathologist.

Agricultural Station, Bermuda,
9th. March, 1925.

Report of the Inspector of Produce for the Season 1923-1924.

The Director of Agriculture,—

I have the honour, under the provisions of The Agricultural Inspection Act, 1921, to forward my report on the inspection of produce and lily bulbs shipped from the Colony during the season 1923-1924 and of seed potatoes imported during the same period, and on the marketing of Bermuda produce in New York, and other duties performed.

INSPECTION OF SEED POTATOES.

During the season 7,990 barrels of Garnet seed potatoes were imported. The first importation arrived on 30th October, 1923. Taken as a whole the seed was of very good quality, in good condition, and true to type. As a rule the barrels were well filled and properly coopered, and only a few marks showed slack packing. In a few cases there were traces of rot probably due to late blight.

In February and March, 1924, 700 barrels of Triumphs were imported to be planted for seed for early fall use. There were also imported 210 barrels of Cobblers to be planted for home consumption. Both importations were of good quality.

During August and September, 1924, there were imported 3841 barrels of Triumph seed for fall planting, the first consignment arriving on 18th August. This quantity was made up as follows:

From Long Island, N.Y.	Grown by.	Shipped by.
1078 barrels.	Hy. Zimmer & Son.	E. F. Darrell & Co.
1712 "	Hickox-Rumsey Co.	Grower.
From Fredericton, N.B.		
846 barrels	New Brunswick Brokers, Ltd.	Growers.
From Belmont, N.Y.,		
180 barrels	R. Darrell & Co.	Grower.

Imported by J. W. Frith, 25 barrels for own planting.

The consignment forwarded by Messrs. E. F. Darrell & Co. showed fairly true to type, but the selection, packing, and containers were on the whole poor. The consignment from Messrs. Hickox-Rumsey Co. showed great care in selection, packing and containers, and were true to type. The 810 barrels from the New Brunswick Brokers, Ltd., appeared to have been harvested before full maturity. Whilst the containers were good, there was lack of care in selection, grading and packing. Want of care in these respects is particularly regrettable in potatoes intended for seed. Messrs. R. Darrell & Co's. potatoes, though not large, were true to type and carefully selected and packed.

INSPECTION OF PRODUCE.

Green Vegetables.—On the 4th. December, 1923, the green vegetable season began with a shipment of 50 crates beets and 137 crates kale. The ship carried also 63 barrels of potatoes.

On the whole the vegetable crop may be described as good.

Fava Beans.—Very little disease was in evidence, and the quantity exported was nearly double that of last season.

Beets.—The beets exported had generally too much top, and the roots lacked colour. These defects are, in my opinion, largely due to the variety planted.

Carrots.—The carrot crop was a great improvement on that of the previous season. It was mostly of the long variety so much in demand, and it was obvious that the proper variety of seed had been imported.

Celery.—The celery crop of 1924 was about 70 per cent. in excess of that of 1923, which was itself a record. The quality however did not attain the standard of 1923. Black-heart, seeders and blight were responsible for this state of things.

Kale.—Kale constituted a record crop also. With the few exceptions mentioned in my weekly market report, the quality was good.

Lettuce.—Less acreage was under lettuce than last season, but the crop was more than 70 per cent greater and the quality, generally, was superior to that of past seasons.

Parsley.—The quality of this crop was good, and the prices were the highest ever realised. Full details of sales are presented in my market report.

Onions.—The onion crop was a complete failure. Poor quality and keen competition together conspired to bring about this state of affairs.

Potatoes.—Considering the acreage planted with Triumph potatoes the yield was below the average. This was attributable chiefly to leaf-roll, which seriously affected the crop, and to a lesser extent to the high winds which damaged the plants at a time when they were in full foliage. The Garnet crop was on the whole up to the average, although in the early part of the season very high winds did a great deal of damage. The export returns do not show an average shipment of Garnets, but it should be borne in mind that a considerable quantity was kept for home consumption. Cobblers gave, in some cases, a very high yield, as did also the Triumphs imported and planted for seed.

Produce Rejected on First Inspection.—The percentages of produce rejected on first inspection were as follows: Celery, 2.8; other green vegetables, slightly under 2; onions, 3.2; and potatoes,

7. Most of this produce was made good with respect to the defects found in it (undersize, slackness, improperly coopered or nailed, poor crates, etc.) and was passed on the second inspection.

References and Appeals.—One.

Prosecutions.—None.

Quantities Shipped.—The following quantities of produce were shipped:

	Canada.	West Indies.	United States.	Totals.		
Beans, Fava	—	—	3,024	3,024	Bushel - crates.	
Beans, String	—	—	16	16	"	"
Beets	453	—	28,531	28,984	"	"
Cabbage	267	—	—	267	"	"
Carrots	1,726	—	87,019	88,745	"	"
Celery	75	—	67,116	67,191	"	"
Kale	—	—	28,053	28,053	"	"
Lettuce	—	—	5,414	5,414	"	"
Onions	23,194	6,524	12,130	41,848	"	"
Parsley	—	—	56,346	56,346	"	"
Peas	—	—	16	16	"	"
Potatoes	—	1,212	34,042	35,254	barrels	
Tomatoes	1,048	—	—	1,048	bushel	crates.
Turnips	12	—	794	806	"	"
Miscellaneous	—	9	826	835	"	"

Total number of green vegetables shipped, 280,745 bushel crates.

SUPERVISION OF STOWAGE IN CHILL-ROOMS

The supervision of stowage of vegetables in the chill-rooms was carried out chiefly by Mr. E. L. Adams, Assistant Inspector, who was in charge of the service in my absence. Mr. Adams reports that he estimates that he inspected the chill-rooms 245 times during the season. The stowage was considered to be satisfactory except on two occasions when too little dunnage was used because no further supply could then be obtained at about 11 p.m. The handling of the cargo was considered to be satisfactory as a rule, and the breakages of crates was largely due to poor material used in their construction.

MARKETING OF PRODUCE IN NEW YORK

From January 21st to June 21st I was in New York employed in investigating the market conditions there, observing the condition of shipments on arrival and exercising a general supervision over matters affecting the industry. During this period the Department was kept informed of market conditions by letters by every boat and more frequent cables. This information was made public in Bermuda.

A full report, in diary form, covering this period has been presented, and the following abstracts from its are herein included.

January 19th.—I left Bermuda by S.S. Fort Victoria, having on board 705 barrels of potatoes and 10,758 crates of green vegetables. The chill-room temperature was satisfactory during the voyage. We arrived at Pier 95, New York, at 11 a.m. on 21st and began unloading from all three hatches at 1 p.m. Vegetables came out in good condition on the whole.

January 23rd.—On going to the market I took estimates of the stock of potatoes in store, and found about 15,000 barrels, somewhat less than the quantity on hand at the corresponding time last season. Potatoes selling slowly at $14 to $15, and the look-out good. Texas carrots are very plentiful in the market, and though not of the best quality yet tend to reduce the price of Bermuda's below a profit to the farmer. The outlook for parsley is good in consequence of a second freeze at New Orleans.

January 24th.—Although not buying many, buyers are constantly enquiring about Bermuda potatoes and I should say that the outlook is distinctly good. Some receivers sold parsley too low, the whole shipment should have gone out at $6.50.

January 25th.—On looking over the potatoes in the store found a few marks showing a little rot. These are mostly from pond land. The market is full of domestic vegetables selling at a low price.

January 29th.—The wide range of parsley prices is to be attributed to a difference of opinion amongst receivers as to what the market would stand. Some sold out at $7.50 and afterwards those who had held easily secured $9.00. The whole shipment could have been disposed of at the latter price. On delivery 100 crates were short.

January 30th.—Took up with dock officials this morning the matter of short delivery of parsley. Found a surplus of carrots on the dock. Advised the Director of Agriculture regarding the parsley shortage and advised him to have the matter investigated, also suggested that in future parsley be shipped separate from other vegetables.

February 4th.—The parsley was stacked up on the dock and delivered separately, and the quantity was found to be correct. The kale not being wanted till the next day was left in the chill-room, and the potatoes were also left on board, thus accelerating the discharge of vegetables and facilitating the checking of parsley.

February 5th.—A strong demand for parsley this morning, an advance to $12 was anticipated, but buyers refused to rise to that price. The heavy receipts of carrots and beets from Texas, were productive of a drop in price. I was sorry to see a poor variety of kale arriving from Bermuda.

February 11th.—As to-morrow is Lincoln's birthday and a general holiday, the vegetables were all carted to the stores. Most of the potatoes were left on board to be taken off on Wednesday morning.

February 13th.—Was accompanied to the market this morning by Mr Ogilvie, Plant Pathologist. Only a small quantity of potatoes went for $16.00, the ruling prices being $14.00 to $15.00. Some shippers cabled their agents to hold for $16.00. This was in my opinion a mistake, and its effect upon the market was reflected during the remainder of the season. I had already recommended selling at $14.00 to $15.00.

February 15th.—Checked up the potatoes in store and found about 4,000 barrels and advised the Director of Agriculture to that effect. Five thousand sacks of carrots to cost $2.00 a sack landed are expected next week from Germany. Each weighs about 180 pounds.

February 19th.—No change in potatoes. Parsley went to $12.00 owing to a scarcity in the market. This is the highest price ever realized for parsley. German carrots in the market and selling very slowly at low price.

February 23rd.—A small lot of Triumphs in from Cuba. The tubers are not very large, but look bright and attractive. For three years past there was an embargo on Cuban potatoes; this source of supply will be an important competitor with Bermuda in the future.

February 27.—On counting over some slack crates of parsley I found several containing only 38 to 46 bunches, and beets as low as 11 bunches to the crate. In face of the keen competition in Texas it seems clear that this kind of pack is highly detrimental to Bermuda. The first consignment of Triumphs from Hastings, Florida arrived.

March 4th.—The heavy consignments of parsley caused a big drop to $4.50. Florida, California, Cuba and several other localities on the market in large quantities. Carrots and beets from Texas literally flood the market. Most do not realize even the freight.

March 7th.—I began enquiries as to the outlook for celery. New Jersey will not begin to ship before June 15th.

March 10th.—It had been arranged between the steamship company and the receivers to delay discharging until 7 a.m., Tuesday. This arrangement had been made without my knowledge. On being made aware of it I got into communication with the Company and put up a strong protest, as a result of which discharging was begun at 7 p.m. and there was a midnight delivery.

March 11th.—The wide range in the price of lettuce ($1.50—$2.75) is merely a reflection of the quality. Larger lettuce would easily have sold for $2.50 to $3.00.

March 12th.—Some vegetables which were left over from yesterday were sold at much lower prices, so if there had not been a midnight delivery on Monday the farmers would have sustained

a heavy loss, as Texas carrots and beets arrived heavily this morning as well as romaine from Florida.

March 13.—There were two car-loads of Virginia second crop potatoes in the market to-day. They look bright and attractive, but are, I am informed, inferior to ours in quality. Some 10,000 barrels of these are in storage.

March 17th.—No change in price of Bermuda potatoes. One car-load of Spalding Rose in from Sabastian, Florida, the first of the season from that section.

March 19.—There is good reason to believe that if the vegetables had been in the market on the regular day, Tuesday, prices would have been somewhat better.

March 31st.—Carrots and beets are much too large for the trade. The first consignment of Garnets are not up to the standard, being small and of poor colour.

April 2nd.—Left by S.S. Fort Victoria for Bermuda.

April 26.—Reached New York at 12 noon. Temperature of chilroom satisfactory during the voyage. I found the market for onions and potatoes very weak. Onions are coming in heavily from Texas and potatoes from Hastings.

April 29.—The price of carrots has advanced considerably. Beets have also advanced slightly. In general, the outlook for vegetables, especially carrots is better. The weakness in potatoes is attributable to the heavy receipts from Florida, 144 carloads having arrived in three days.

May 5th.—Carrots and beets by this steamer are overgrown and the tops are in poor condition. A considerable quantity of the celery is green and immature. This is certain to have an ill effect on the market.

May 8th.—Received from the Director of Agriculture the following cable: "Will topping celery injure sale." To which I replied: "Cut three inches above top crate."

May 11th.—The parsley arriving to-day was more or less in a decayed state. To account for this, I assign three probable causes: (1) Lack of vitality owing to the lateness of the season. (2) The lack of oxygen and the accumulation of noxious gases in the chillrooms in consequence of the presence of celery. (3) The lower temperature required for celery. Parsley and other vegetables carry satisfactorily at a temperature not below 38 degrees F., whereas celery demands 36 degrees F. Any one of the afore-mentioned causes would be sufficient to effect the damage, but it appears more than likely that all three operated. A goodly number of broken celery crates was in evidence. On examination it was found that the breakages were due to the use of onion box slats which are too light for celery crates.

May 13th.—About 300 crates of parsley were in a condition of decay such as to render their destruction necessary.

May 19th.—Fort Victoria arrived at 11.30 a.m. with 3,380 barrels of potatoes, 8,878 crates of vegetables, 1,023 half-crates of fava beans, 11 crates of kale, 7,117 crates of celery, and 1,138 crates of onions. The celery, except for a few cases, was in very good condition, but the vegetables in No. 1 and No. 2 were all more or less decayed and will probably involve serious loss. There was no dunnage between crates in the hatches.

May 20th.—Parsley, which on being landed yesterday appeared to be in good condition, was found this morning upon inspection in the market to be decaying with great rapidity.

May 21st.—On visiting the dock this morning to ascertain the state of affairs there, I found 1,500 crates of vegetables which had been refused by receivers.

May 22nd.—One carload of Triumph potatoes from Charleston on the market to-day looking very fine and bright. This is the first arrival of the season from Charleston.

May 26th.—Mr. E. L. Adams, Assistant Inspector, came by this steamer, and remained on the dock with me until late that night watching conditions of discharging and of vegetables on landing.

May 27th.—Took Mr. Adams with me to the market this morning and introduced him to the receivers. 153 carloads of Florida potatoes on the dock to-day.

May 28th.—Received from the Director the following cable: "Are carrots without tops selling as well as with?" To which I cabled reply: "Carrots realize more without tops." There are heavy receipts of Norfolk carrots in to-day.

June 3rd.—The carrots sold at 75 cents. those with tops and those without tops sold at $2.50 to $3.50.

June 4.—Market full of all sorts of vegetables from the Souht. Large quantities are being refused and not selling for sufficient to pay the freight.

June 5th.—The first consignment of Eastern Shore potatoes in to-day.

June 6th.—Owing to heavy receipts of carrots from the South our carrots had to be sold at much lower prices in order to clean up.

June 9th.—The celery arriving to-day was mostly small and green and some tops showed blight.

June 12th.—The quality of celery was only fair at best, but owing to very light receipts from Orange County sold rapidly at fair prices.

June 19th.—The Orange County celery season fairly started.

June 23rd.—Arrived in Bermuda and resumed duties there.

INSPECTION OF LILY BULBS.

The inspection of the 1924 lily crop commenced on the 28th June at the Sunnylands packing house, when 27 cases were inspected, and finished on October 11th with a lot of 18 barrels narcissus bulbs at the packing house of the E. Worrall Outerbridge Co. During the packing season I was extremely busy, and paid frequent visits to the following packing sheds: Dr. Theodore Outerbridge, Sunnylands, Paget; Messrs. E. Worrall Outerbridge Co., Mount Pleasant, Shelly Bay; Messrs. Henry & Lee, Court Street, Hamilton; Messrs. Stephens Bros., Seabright, Paget; Mr. H. L. Pearman, Hamilton; and Mr. T. H. Doe, Paget.

All bulbs were subject to rigid inspection and from 10 per cent to 50 per cent. of every shipment was closely examined. A marked improvement in the quality of the bulbs was evident. During the year a total of 74 original certificates and about 3,658 copy certificates have been issued, the bulk of these have been on inspections which I have made. A total of 875,070 Easter Lily bulbs was inspected.

OTHER SUMMER DUTIES.

From July 22nd to August 18th I acted as Officer-in-Charge of the Department in the absence of the Director and the Plant Pathologist. During the summer the fumigation shed and the egg-laying pens were erected under my direction, and in the absence of the Director I supervised the field work of the Station. The Farmers' Market was regularly attended throughout the year except when I was absent in New York on duty, when the Assistant Inspector superintended the market. Other summer duties which claimed my attention were the partial revision of the local mailing lists, supervision of Agricultural Club corn exhibits sent in to the Station to be judged, distribution of vegetable seeds for co-operative testing, collection of information regarding banana culture, and visits to farms and schools. I estimate that during the year under report 117 visits to farms were made by myself, and 33 by the Assistant Inspector. Reports of my summer duties have been presented monthly.

REMARKS AND RECOMMENDATIONS.

Beet and Onion Seed.—The lack of quality in beets was largely due to the strains or varieties of seed used. The small crop of onions was due to the fact that the seed now used is producing crops poor in quality and too late for the New York market, and the acreage planted is steadily decreasing.

Standard Pack.—The standard pack of a minimum of eighteen bunches of roots per crate, put into operation by Regulation this season, proved beneficial to the farmers by inspiring confidence on the part of the buyers.

Standard Celery and Kale Crates.—The standard crates for celery and kale have worked well. Buyers now have more confidence with a consequent good effect on the price. It is to be regretted that during the season under report there was a slight reversion to small crates for celery. There were reasons for this in the shortage of standard crates and lack of chillroom space, but it is to be hoped that during the coming season small crates for celery will not be used.

Standard Onion and Vegetable Crate.—There is in progress a movement toward a standard crate for onions and green vegetables. Every effort should be made to put this crate in use during the coming season.

Greater Variety.—I would again recommend that efforts be made to introduce other vegetables on the New York market.

Reduction of New York Receivers.—I would once more recommend a reduction in the number of New York receivers of Bermuda produce. A reduction is particularly desirable with regard to the receivers of celery.

Improvement in Quality of Potatoes.—With regard to potatoes, it is to be observed that though the size was satisfactory, there was evidence of lack of care in packing and general care of the crop. Increased competition from Cuba and new sections in Florida will be met next season, and this may render it necessary to sell a larger quantity of our potatoes earlier in the season.

No. 3 Potatoes.—No 3 grade potatoes should on no account be shipped, for, as I have previously remarked, they are always difficult to sell, and are often quite unsaleable.

Sales in Canada.—The selection of a single Canadian house to receive and distribute Bermuda produce throughout the Dominion next season should give satisfactory results by the control of the output to the various Canadian markets.

Assistant Inspector's Visit to New York.—I was glad to see Mr. E. L. Adams, Assistant Inspector of Produce, on a visit this season to the New York market. I think it highly desirable that the Assistant Inspector should make one or more such visits every season to observe conditions at first hand.

Lily Bulbs.—It is quite noticeable that growers of Bermuda Easter lilies are discarding the late type of bulb, and there is a consequent improvement in the quality of the stock offered for shipment. The process is being continued, and indications point to still further improvement next season. The attention of growers has been repeatedly called during the past two seasons to the Regulation governing the inspection and shipment of bulbs. This calls for the separation of the two types, and as sufficient time has now been given growers to rogue out the poorer type, I recommend that in the season of 1925 the Regulation be more strictly enforced.

Acknowledgment.—I have once more to acknowledge gratefully the courtesy and consideration shown me by the New York dock officials of the Furness Bermuda Line.

I have again to record my obligation to Capt. N. E. Holmes, Wharfinger, for setting aside space for repacking produce.

My thanks are due to Mr. E. L. Adams, Assistant Inspector of Produce, who was in charge of the Inspection at the Bermuda dock during my absence on duty in New York.

Respectfully submitted,

G. E. WINTER,

Inspector of Produce.

Devonshire,

December 31st, 1924.

Report of the Government Veterinary Officer for the Year 1924.

The Director of Agriculture,

I have the honour to submit for your consideration my report for the year ended 31st December, 1924.

Inspection of Imported Live Stock.—All animals, including poultry, imported into the Colony are inspected on arrival. Horses, mules, cattle, pigs and dogs are examined individually and the certificates obtained. In cases where certificates are not presented animals are ordered to be segregated on occupant's premises for such time as is deemed necessary and other precautions taken. All horses undergo the opthalmia test for glanders and farcy either by myself or some other qualified veterinarian who forwards the results to me. Up to this time no case of glanders or farcy has been reported in the Colony, and this is no doubt in measure due to the knowledge on the part of importers that an inspection will be made before landing. Poultry are inspected in the crates, and any diseased birds observed are ordered isolated or destroyed. The general health of all imported stock during 1924 was excellent.

The conditions under which live stock was imported are good with the exception of poultry, and this has been improved since by regulations the size of the crate has been enlarged. The horse and cattle stalls and boxes which are used by the steamship companies are roomy and sanitary, and are examined from time to time, and the agents of the companies, who are always courteous and willing to carry out any recommendations made, are advised regarding them, and they are always maintained in good order.

Condition of Premises.—The condition of premises used wholly or partially for (1) keeping or custody, or (2) slaughter of animals, or (3) storage of carcases, or (4) sale of carcases is generally good.

The condition of premises used for the keeping of live stock is much improved since sanitation has been urged by the Medical and Health Department, which, in great measure, is responsible for the improved condition. I wish to compliment live stock owners and more especially dairymen for the way that most are complying with the dairy regulations laid down by the Board of Health. Animals have improved in condition and in milk supply. The standard of milk to-day is much higher than formerly. This does not imply that this product was at any time unfit for food, but that better animals have been added to the herds, and the sanitary conditions improved.

In my inspections of premises used for the custody and slaughter of animals I have always found them clean and sanitary, and far above the average places used for this purpose elsewhere. The storage plants used for slaughtered animals are

well kept from a sanitary and refrigeration standpoint, and during the past year I have had no cause to find any fault. Every method known to the owners of these plants is practised in the endeavour to keep the products for human consumption clean and free from contamination. During the year 33 recorded inspections were made of chill-rooms and premises.

Control of Local Infectious Diseases.—No outbreak of any equine disease has occurred in the Colony during the year.

Bovine tuberculosis has been reduced considerably throughout the Colony since 1914. In my opinion, this result has been brought about by two causes, (1) rigid inspection regulations, and (2) the scourge of epizootic apthae or foot and mouth disease among cattle during 1914 and 1915. Animals that were at that time affected with bovine tuberculosis succumbed to the raveges of the scourge or, if they recovered, were rendered useless, and were destroyed later on. During the year under report four cows have been slaughtered because of this disease, and as soon as one is reported unthrifty, or noticed to be, as the saying is, off colour, it is subjected to the tuberculin test, and if reaction occurs, is immediately destroyed. During my tenure of office every case that has reacted to the test has proven by post mortem to have been affected. Compensation was paid for one carcase.

During the latter part of 1923 and early part of 1924 a number of pigs in Paget died from what appeared to be our old enemy hog cholera, but upon post mortem examination no findings of this disease were to be observed, but the organs showed the appearance of a serious ptomaine poisoning. After the hotel swill which was fed was examined a diagnosis of pig enteritis was made, and when this food was withheld and a change of diet made the mortality became nil. Three suspicious cases came under observation in Southampton, but no further spread occurred. Including both healthy and diseased animals, 389 hogs were vaccinated.

During the fall a disease developed among poultry in Paget which caused the loss of many head. From outward symptoms a diagnosis could not be readily made, but having had experience with a like trouble years ago in Rhode Island and Massachusetts, I was led to suspect avian enteritis which is in a way very contagious. I made two autopsies on specimens, and verified the suspicion. This disease did not spread to any extent. Treatment and sanitary precautions were advised, and no further cases were reported.

Examination of Cruelty Cases.—This particular part of my duties has been very satisfactory, inasmuch as the Police authorities and I have cooperated. The idea is not to prosecute unless advice and caution fail. The method has given better results than bringing every case into court, and often failing to convict. It must be borne in mind that one case lost has a bad effect upon the intentional offender. As a rule, it is on my certificate that prosecution does or does not take place, and in a great many cases what appeared to be gross cruelty was nothing more than gross ignorance. Professional evidence was given in 16 cases. In this

connection I wish to give credit to the Police for the able assistance they have afforded me in the performance of my several duties as Government Veterinary Officer.

Condition of Department's Live Stock.—The live stock at the Station is in excellent condition. The cows are calving regularly, though the absence of heifer calves is to be regretted. The Department has added to its stock by the importation of Toggenburg goats, and I would recommend a further small outlay along this line, for it is wise to remember that "the goat is the poor man's cow" and physicians and dieticians recommend goat's milk for babies when cow's milk does not give the desired results.

General Conditions of Live Stock.—The standard of imported stock is above that of any other year since inspection regulations became law. The quality of the driving and draft horse is above the average, and while dairy cattle have been imported only in small numbers, the type as a rule has been good.

The hog industry has not increased as much as I would like to have seen it, and it is evident from conversations with farmers that they are skeptical about vaccination being a preventative of hog cholera. I would suggest that the Department devise some means of bringing to their notice the results obtained elsewhere by the use of anti-hog cholera vaccine.

The health of live stock is at present excellent, and the majority of the horses in the Colony to-day, both driving and draft, would be a credit to any community.

Poultry has been imported in goodly numbers. Some fine specimens for breeding purposes have come to the Colony, and their exhibit in the show of 1924 gave evidence of their high quality. This is a fitting place to warn poultrymen how careful they should be in maintaining a strictly sanitary plant, especially where such good specimens are located, because when disease enters into a flock the financial loss is very great to the breeder of show or production birds. Of the Egg-laying Contest supported by the Bermuda Poultry and Pet Stock Association, and now in progress under the direction and supervision of the Secretary of the Association, the Director and myself, I cannot speak too highly, for it shows the interest that is being taken by poultry breeders to increase productivity, and I expect in the near future to see an International Contest staged in the Colony, for from a climatic standpoint no country can supply the necessary surroundings for a successful test equal to Bermuda. The contest will need Government assistance, and I know of few schemes that, for the amount of finance involved, would advertise us more.

I wish to comment once again on the nuisance of the ownerless and uncollared dogs that parade our streets. I have made recommendations to the Board and to the Board of Health, and am of opinion that some action should be taken.

The year just closed, in my opinion, marks another milestone on the road of the Colony's live stock industry, for live stock

in Bermuda both from quantity and quality standpoints exceeds that of any previous year within my recollection.

Respectfully submitted,

R. L. TUCKER,
Government Veterinary Officer.

Brightside, Flatts, Bermuda,
14th. February, 1925.

APPENDIX A.

Comparison of Retail Prices of Farm Supplies and Services in 1913 and 1924.

	1913.	1924.
Rent, estimated increase		No increase.
Labour, per day	4/- to 5/-	8/- to 10/-
Seed, Potato—Triumph, barrel	19/-	46/-
Garnet, "	13/-	26/-
Onion, pound	8/-	10/-
Beet, "	3/6	5/-
Carrot, "	3/6	5/-
Parsley, "	3/-	6/-
Fertilizer, Castor pomace, English, 100 lbs.	5/3	9/6
Castor pomace, American, 100 lbs.	6/-	10/-
Horse manure, cart load	4/-	6/-
Spraying material, Lime, bushel	10d.	1/9
Blue stone, pound	4d.	10d
Pyrox, 100 lbs.	55/-	95/-
Containers, Barrels	1/6	4/-
Crates, bushel, each	5½d. and 6d.	1/3 and 1/5
" celery, each	10d.	1/9
Nails, 100 lbs.	13/-	40/-
Ocean freight, potatoes, barrel	50c.	80c.
Onions, crate	14c.	20c.
roots, crate	25c.	25c.
top crops, crate	30c.	25c.
celery, crate (2 but.)	60c.	65c.
Cartage in New York, barrel	7c.	25c.
crate	4c.	10c.
United States import duties, potatoes	free	½c. per lb.
onions	40c. per bus.	1c. " "
beets	3% ad. val.	17% ad val.
Other Vegetables	15% " "	25% " "
Distributors commission	8% and 10%	10% and 12%

APPENDIX B.

Comparison of Average New York Prices for Bermuda Produce in 1913 and 1924.

	1913.	1924.
Beets, bushel crate	97½c.	$ 1.44
Carrots, " "	95c.	1.67
Celery, 2 bushel crate	3.40	7.44
Lettuce, bushel crate	1.34½	1.91
Onions, " "	1.53	1.77
Parsley, " "	1.07	4.90
Potatoes, barrel	5.97	11.67

APPENDIX C.

Expenditure (Exclusive of Salaries) for the Year Ended 31st December, 1924.

1. FEES TO MEMBERS OF BOARD.

Appropriated by Act No. 43, 1923				£70	0	0
Paid to Members for attendance	66	8	0			
Unexpended balance	3	12	0			
	£70	0	0	£70	0	0

2. GENERAL GRANT.

Appropriated by Act. No. 43, 1923				£2,200	0	0
Labour on experimental plots, lawns, flower beds and glass-houses, and care of live stock	1387	15	0			
Carting and ploughing	66	7	1			
Manure and fertilisers	95	3	0			
Seed potatoes, seeds, bulbs and plants	132	6	0			
Live stock—feed, bedding and incidentals	277	5	5			
Repairs and renewals of tools, implements, buildings, etc. ..	109	3	9			
Furniture	44	6	6			
Cleaning offices	7	17	9			
Stationery and printing, local	30	4	7			
" " " foreign	21	3	7			
Agricultural Clubs, corn prizes to	6	13	6			
Sundry	21	13	6			
Unexpended balance			4			
	£2,200	0	0	£2,200	0	0

3. INSPECTION SERVICES, MARKET INVESTIGATION AND CONTINGENCIES.

Appropriated by Act No. 43, 1923				£1,250	0	0
Inspection at dock	473	10	3			
Inspection of seed potatoes in Canada and the United States.	125	7	8			
Representative in New York market	220	18	3			
Investigations made by Director, in England, Jersey and France	33	6	3			
Cables	30	8	6			
Printing, foreign	22	6	3			
Supplies and contingencies ...	154	7	6			
Unexpended balance	189	15	4			
	£1,250	0	0	£1,250	0	0

4. ERADICATION OF ANIMAL DISEASES.

Appropriated by Act No. 43, 1923				£100	0	0
Compensation to owners of condemned stock	27	0	0			
Erection of isolation stable	40	2	5			
Supplies and contingencies	32	16	1			
	£100	0	0	£100	0	0

5. PURPOSES OF PLANT AND BULB DISEASES AND PESTS ACT.

Appropriated by Act No. 43, 1923				£250	0	0
Labour	54	13	6			
Insecticides	58	8	3			
Erection of fumigation building	71	19	0			
Equipment and contingencies	58	16	11			
Unexpended balance	6	2	4			
	£250	0	0	£250	0	0

6. IMPROVEMENT OF LIVE STOCK.

Appropriated by Act No. 43, 1923				£100	0	0
Toggenburg buck goat	13	13	0			
Supplies and contingencies	42	12	2			
Unexpended balance	43	14	10			
	£100	0	0	£100	0	0

7. ANNUAL EXHIBITION.

Appropriated by Act No. 43, 1923				£300	0	0
Labour, material and contingencies	£300	0	0			
	£300	0	0	£300	0	0

8. PURCHASE OF BOOKS AND SCIENTIFIC APPARATUS.

Appropriated by Act No. 43, 1923				£50	0	0
Apparatus, books and contingencies	49	1	6			
Unexpended balance	0	18	6			
	£50	0	0	£50	0	0

9. EXPENSES OF REPRESENTATIVE ATTENDING INTERCOLONIAL CONFERENCE AT JAMAICA.

Appropriated by Act No. 43, 1923				£100	0	0
Travelling expenses, subsistence and contingencies	99	13	4			
Unexpended balance	0	6	8			
	£100	0	0	£100	0	0

10. EXPENSES IN CONNECTION WITH EGG-LAYING COMPETITION AND EXHIBITION OF POULTRY.

Appropriated by Act No. 43, 1923				£75	0	0
Labour employed in erecting pens	£15	8	0			
Supplies and contingencies	54	17	1			
Unexpended balance	4	14	11			
	£75	0	0	£75	0	0

11. DEPARTMENTAL CONTINGENCIES, TRAVELLING EXPENSES OF OFFICERS OF DEPARTMENT, TELEPHONES, LIGHTING, ETC.

Appropriated by Act No. 43, 1923				£120	0	0
Carriage hire	£42	0	0			
Telephones	8	2	6			
Electric light and power	6	13	0			
Foreign postage	10	10	0			
Printing, local	45	0	0			
Supplies and contingencies	7	11	7			
Unexpended balance	0	2	11			
	£120	0	0	£120	0	0

12. THE IMPERIAL BOTANICAL CONFERENCE RESOLVE

Appropriated by Resolve No. 6, 1924				£150	0	0
Travelling expenses, subsistence and contingencies	£150	0	0			
	£150	0	0	£150	0	0

APPENDIX D.

Statement of Reimbursements to Government, and Value of Produce Supplied to Other Institutions during the Year Ended 31st December, 1924.

1. REIMBURSEMENTS TO GOVERNMENT.

Sale of vegetables, plants, etc.	£109	12	7
Sale of live stock	34	10	0
Live stock fees	34	8	0
Registration fees from seedsmen	2	10	0
Miscellaneous receipts	1	18	0
	£182	19	3

2. PRODUCE SUPPLIED TO OTHER INSTITUTIONS.

Milk to King Edward VII Memorial Hospital ..	£124	16	0
Vegetables to King Edward VII Memorial Hospital	88	15	0
Vegetables to Hamilton Gaol	25	14	6
Vegetables to Lunatic Asylum	21	13	0
Vegetables to St. George's Gaol.....	8	0	0
Vegetables to Nursing Home	6	16	0
	£275	14	6